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Tuberculin Tests in Cattle (with Special Reference to the Double Intra-dermal Test) from the standpoint of the Practitioner.*

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The tuberculin test, in one or other of its forms, is, up to the moment, our most valuable weapon in the campaign against bovine tuberculosis. It may be that the perfection of a vaccine will later abolish very largely the need for tuberculin testing, but as long as we require a tuberculin test, if it is to be used on a large scale it must be cheap and efficient. The costly combined subcutaneous and ophthalmic test demanded by the Ministry of Health in connection with Certified and Grade "A" (Tuberculin Tested) Milk will never be employed in a sufficient number of herds for the milk produced by them to benefit the public health to an appreciable extent—at least, not as long as the farmer is asked to pay for it. It is fortunate that the Ministry will now accept the combined double intra-dermal and ophthalmic test for this purpose. In this country the present must presumably be regarded as an educational stage, the reason being that the almost certain result of tuberculin testing, up-to-date, is not a material reduction in the number of tuberculous cattle, but merely the weeding out of affected animals from some herds and their transference to other herds.

Tuberculin testing is therefore unlikely to produce an effect of consequence on the milk and meat supply until it becomes compulsory, and with it the compulsory branding of reactors and their control until disposed of. It does not fall within the scope of this paper to discuss the composition of tuberculin; it is sufficient for our purpose to know that it is a biologic preparation used in two concentrations, the one suitable for subcutaneous use and the other for the purpose of causing local reactions. Its potency is of great importance and it requires standardisation. It should be marketed with a warranty to the effect that an agreed standard has been complied with, and it should be supplied only to registered persons. The bottles or tubes should carry the date of manufacture of their contents. We are sometimes asked to state the date of purchase of the tuberculin used in a given test. As date of purchase may not be an indication as to the length of time the material has been in stock in the laboratory or warehouse, the date of manufacture would appear to be more useful information.

The Ministry of Health considers tuberculin to be fresh for twelve months if kept in hermetically-sealed tubes. Tuberculin is apparently a fairly stable preparation if properly kept, but Jowett, writing in the *Jnl. of Comp. Path.* in 1914, said: "It is affirmed by some investigators that whilst the concentrated (undiluted) tuberculin undergoes but little change when stored under suitable conditions, the case is different with diluted tuberculin, the latter being unstable and undergoing more or less profound deterioration as a result of storage, and should be injected not later than two or three weeks after dilution."

In spite of this, if the absence of cloudiness is to be regarded as an indication of reliability, it would appear that ordinary dilute tuberculin is usually good for many months when kept in rubber-stoppered bottles. Many theories have been advanced as to the manner in which tuberculin provokes a reaction, but Calmette says "It results from a lytic action on the part of certain substances contained in the body fluids of subjects infected with the bacilli upon the tuberculin; and this lytic action gives rise to the formation of a specific product, both toxic and fever producing, which is the essential factor in general or local reactions. When the lysis is too intense and severe it may cause death through an over acute intoxication." In the quest for a test which will combine convenience with accuracy, many methods of employing tuberculin have been devised, but for our purpose I think we have only to consider the ophthalmic, the subcutaneous and some of the intra-dermal methods.

To be something approaching the ideal, the method of testing should fulfil the following conditions:—

(1) Its technique should be simple and the interpretation of results should be easy.

(2) It should be accurate in ordinary cases and also when the animals have been recently tested, doped or otherwise interfered with.

(3) It should interfere as little as possible with the ordinary routine of the farm.

(4) It should be suitable for animals of all ages and both sexes, for cows advanced in pregnancy, for those which have recently calved, and for animals suffering from systemic disturbance.

(5) It should be possible to commence the test on all or any of the animals on the programme at the first visit.

(6) It should be convenient for testing animals near home and at great distances from home.

(7) It should make as little demand as possible on the time of the veterinary surgeon, so that the busy single-handed practitioner may be able to deal in person with the complete test.

(8) It should not blemish the animals.

(9) It should be cheap.

It would be equivalent to asking for the moon if one were to expect all those virtues in a single test. One has to be satisfied with the next best thing and

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for general purposes I think this is undoubtedly an intra-dermal test.

With your indulgence I will try to indicate (by a circuitous route) why an intra-dermal test is the most satisfactory test for general work.

The Ophthalmic Test.

First let us consider the *Ophthalmic Test*, which sometimes serves a useful purpose as a check test in combination with the intra-dermal or subcutaneous tests (one of both). In spite of some views to the contrary, I shall be surprised if the majority of practitioners do not agree with M'Fadyean & Sheather who expressed themselves in the *Jnl. Comp. Path.* (1914) as follows: "The conjunctival method used alone is the least reliable of the three when its results are negative." The United States official view of the utility (not of the accuracy) of the ophthalmic test is indicated in Circular 249 of the U.S. Dept. of Agriculture (Oct. 1st, 1920, to Aug. 31st, 1922) where figures show that during this period 6,509 animals were tested by this method as against 427,069 by the subcutaneous and 2,807,516 by the intra-dermic method.

In an article by Jowett (*Jnl. Comp. Path.* 1914) we find that in his investigations 75% of tuberculous animals responded to the eye test, but only mucoid or muco-purulent exudate was accepted as positive. No doubt some of the differences of opinion as to the value of this test result from differences in technique, potency of tuberculin, the period during which observations are made and their frequency, the conditions under which the test is carried out and on what is accepted as a reaction.

The method of application varies; thus one finds that some prefer to drop the tuberculin into the conjunctival sac, others drop it on the eye-ball, some apply it with a brush and others again, partly because of the convenience and partly because of the uniformity of dosage, use a disc of tuberculin. Probably the best results follow the placing of the disc or the painting of the liquid under the upper lid near the outer canthus.

When liquid is used, the dose varies from 1 to 6 drops, according to the make. When used as a single dose, test observations should be made at intervals between the 6th and 18th hours (M'Fadyean).

Used as a double test, a sensitizing dose having been first employed at anything from 16 to 72 hours previously, observations are made after both the sensitizing and diagnostic discs from the 2nd to the 8th hours or longer (U.S.). With the double intra-dermal test a dose is applied when each of the intra-dermal injections is carried out and only two inspections are made—namely, at the same times as the skin is examined.

Reactions are indicated usually by lachrymation and redness of the conjunctiva, possibly swelling, and a free discharge of muco-purulent material. This typical discharge should not be confused with a mucous discharge sometimes seen at the inner canthus as a result of the introduction of some foreign material, nor with a somewhat waxy exudate which is often seen in this position in animals not under test.

Among the advantages of the test are the following:

(1) The action of ophthalmic tuberculin is frequently accentuated by previous injections given subcutaneously and the animal that once becomes sensitive to the eye test will usually react on repeated treatments even at intervals of two or three days.

(2) It lends itself to combination with other methods.

(3) It does not cause much systemic disturbance.

(4) When a subcutaneous test is applied after it, the eye may react again, usually about the 12th hour, although the eye has not been treated again.

Among its disadvantages are:—

(1) The frequent observations which are advisable make serious inroads on the time of the practitioner. My experience of it in connection with the double intra-dermal test has not been very favourable to it and I think this is partly because of the infrequent observations then made.

(2) It is advisable to house the animals.

(3) Although it is advisable to test the left eyes of all animals not secured in stalls and the eyes farthest from the screens or partitions in stalled animals, the scheme is often capsized by the discovery of an eye in an unfit state to be tested; this demands the making of special notes and loses one the advantage of a control eye.

(4) Cattle cannot be safely tested if kept in open barns where dirt can blow freely through. Slight injuries to such a delicate structure as the eye easily lead to confusion.

(5) The discharge can be removed accidentally or intentionally.

(6) Something can be done to diminish the congestion of the vessels. Probably it is adrenalin that is used.

(7) Without seeing the discharge, although the congestion is considered by some to be diagnostic, most people would hesitate to condemn an animal.

(8) The examination and comparison of the eyes in many cow houses are far too difficult to carry out.

The Subcutaneous Test.

The *Subcutaneous Test* calls for careful consideration.

When properly carried out it is a very good test. Unfortunately, even in its most simple form it makes very serious inroads on time and the animals have to be housed for a great many hours. There appears to be some difference of opinion as to what rise in temperature is to be regarded as a reaction. The question of thermometers also requires attention.

The first things to be desired, after accuracy, are that a test should be simple and that it should make as little demand as possible on time so that the whole process can be carried through by a busy practitioner. Therefore, except in special cases to be referred to later, the best results in the field are most likely to be obtained by the use of as simple a formula as

possible, and I am convinced that this formula is the one which accompanies the tuberculin from the Royal Veterinary College. I refer to the form of the test, which can be carried out with five or at the most six visits. The five-visit test has, in my experience, been quite successful in establishing and maintaining tubercle-free herds. The question of what rise in temperature is to be regarded as an indication of the presence of tuberculosis has led to a number of schemes at the hands of different workers. Several of them claim that their results correspond with about 97 or 98 per cent. of the *post-mortem* findings. For average conditions, again, in adult cattle, or at any rate animals beyond the calf stage, I think the scheme is best which makes animals doubtful if their temperature rises to between 103°F. and 104°F. and reactors if their temperature rises gradually to 104°F. or over.

As to the other schemes, we find in them some distinct variations; thus, Ostertag considered a rise of ·5°C. (·9°F.), as compared with the highest pre-injection temperature, should be regarded as a reaction, while Nocard considered a rise of less than ·8°C. (1·44°F.) as being of no significance. He placed animals as doubtful when their temperatures rose to between ·8°C. (1·44°F.) and 1·4°C. (2·52°F.). He considered them reactors when they reached 1·4°C. (2·52°F.) and over.

Hutyra and Marek consider animals over six months of age to be reactors if (*a*) the highest temperature in a typical reaction exceeds the highest recorded temperature before injection by 2·7°F., or if the rise is at least ·9°F. and higher than 104°F.; (*b*) If the temperature rises 1·8°F. to 2·5°F. or exceeds 103·1°F. with symptoms of organic reaction.

Calves under six months of age must show an increase in temperature to over 104·9°F. to be reactors.

The U.S. Department of Agriculture lay down the following:—A rise of 2°F. or more above the maximum temperature observed prior to the injection of tuberculin, or a temperature above 103·8°F. should be regarded as an indication of tuberculosis, provided it shows the characteristic rainbow curve. An elevation of above 103·8°F. should also be regarded as an indication of tuberculosis, even though the so called rainbow curve is replaced by what is termed the "plateau." Animals which after injection show a rise of 2°F. with a maximum of between 103° and 103·8°F. are regarded as suspicious.

The presence of a general systemic reaction or a typical curve should be considered in determining the classification between suspects and reactors.

The physical reaction includes:—Depression, trembling, tympany, chill, loss of appetite, suspended rumination, difficult breathing, diarrhœa, cold extremities, thirstiness and soreness at the point of injection.

The animals should be restrained for a period of at least one or two hours before the test is begun, and during the period immediately before the injection of tuberculin each animal's temperature should be taken at least three times at intervals of not less than two hours.

The taking of temperatures after the injection should commence not later than the 8th hour and be continued every two hours until the 18th hour, when, if there is no tendency for the temperature to rise, the test may cease.

The American test makes a larger demand on time than the one suggested by M'Fadyean and the simplest form of the latter demands five or six fixed time appointments in less than twenty-four hours, but in special cases, as when animals have been recently tested, or there is reason to fear they may have been, two extra appointments are added in the case of the M'Fadyean test and the same applies to the American method. I realise the importance of these observations and in cases where one is frequently testing some dealers' animals it would appear that these extra visits are usually advisable. The same thing probably applies in many of the cases in which one goes long distances to test single animals for purchase for clean herds. In the latter case, it is usually possible to make the necessary observations, but it is not so easy for a single-handed man to deal with the former type of case, nor is it always easy to find our employers ready to pay for the extra visits.

As the subcutaneous test depends mainly on a temperature reaction, some of the conditions which cause variations in the temperatures of normal animals are worth consideration.

In an article by Varrier Jones and Sims Woodhead (*Jnl. Comp. Path.* 1914) it was pointed out that at least five factors may modify the internal temperature during the day, *viz.*, milking, feeding, watering, muscular and other functional activities—excitement must be included among these—and rest. As these variations may affect the temperature curve during a test, I will mention a few points in connection with them. When puzzling charts occasionally crop up, it is well to consider these matters before jumping to the conclusion that the tuberculin has gone wrong.

(1) The temperature is highest during the day whilst the animal is moving about or even standing still, whilst it falls slowly during the night when the animal is at rest. It is usually lowest at from 3 to 5 a.m. and usually highest between 8 and 9 in the morning or between 4 and 6 in the evening.

After milking there is usually a slight rise of ·1° to ·2°F. When food is given, the temperature rises from ·3° to ·5°F. and sometimes ·7°F. within the first hour, but this is followed by a fall of ·2°F. during the next two hours.

There is an immediate slight fall in temperature when food much below the temperature of the body is given. When the animal is watered there is a fall of ·6 to ·1°F. and the temperature remains low for fifteen or twenty minutes, then rises by steps for four or five hours to pre-watering level. It is, of course, for this reason that access to water should not be permitted for an hour before the recording of each temperature and that animals should not be

allowed to drink large quantities of cold water between the 6th and 18th hours of a test.

In the healthy calf there is usually a slight initial fall when food is given, this being followed by a distinct rise. When cold water is given an hour later a sharp fall is invariably recorded. As to the effect of external temperature on the internal temperature of an animal, it was found (1) In the early afternoon the summer temperature is ·2° to ·5°F. lower than winter temperature. (2) At milking and feeding time it rises more rapidly and higher in summer than in winter and from 5.30 to 7 p.m. it is ·3°F. above instead of below winter temperature at the same time of day. During the night and early morning (the period of low temperatures) the summer temperature is always lower than that met with in winter.

The investigations appeared to show that the extremes of temperature covered a range of 1·2°F. in healthy animals and the Royal Commission on Tuberculosis found that the variations in healthy animals following the injection of tuberculin so rarely reached 1·62°F. (·9°C.) that this rise was considered to be an indication of tuberculosis.

As to rectal and vaginal temperatures, Jones and Woodhead concluded that any difference of temperature in these positions is due to the depth to which the thermometer is inserted, and that, with a restless animal, observations can scarcely be relied upon to two or three tenths of a degree. Next there is the question of clinical thermometers :—No doubt we are well advised to use thermometers which have been tested and stamped at the National Physical Laboratory, but it is not safe to assume that such thermometers are all dead accurate ; they often vary from each other to the extent of from one tenth to one fifth of a degree—enough to put an animal in the wrong place if the R.V.C. formula is followed or any similar one, or if a thermometer is broken and another has to be substituted during the test if one of the other formulæ is used.

It is wise to check a thermometer at least every time an abnormal temperature is registered ; I have known a thermometer go wrong during the testing of a herd, and assume that is an experience, which has been met with by other people.

As to the advantages and disadvantages of the ordinary subcutaneous test, the U.S. Dept. of Agriculture says : " It entails more detailed information upon tests records, necessitating the constant attention of the veterinarian and resulting in a very close study of the herd and animals under test. It lends itself readily to combination with the ophthalmic method. It is usually very accurate when applied to an animal or herd for the first time."

As to its disadvantages, the same department says : " Erratic temperatures make it inadvisable to use this test upon very young animals or animals which are hard to restrain. The constant attention which it necessitates makes for physical hardship upon the veterinarian. It is slower than the other methods, limiting the testing to a smaller number of cattle at one time with consequent increase in cost." The American view is largely from the stand-point of the whole time officer on tuberculosis eradication work, and if it makes for physical hardship on him, how much greater must it be for the practising veterinary surgeon who has to attempt to do the work in his stride !

When one is sent a great distance from home to test odd animals, when the initial temperatures are all right, this test is the most convenient.

I have no complaint against the accuracy of this form of test when it can be properly conducted, but there are several disadvantages connected with it. They include :

(1) The demand on the time of the veterinary surgeon, as has already been mentioned.

(2) The inconvenience connected with the housing, feeding and watering of the animals and the danger to the accuracy of the test if the arrangements are accidentally or intentionally interfered with.

(3) The inconvenience of finding odd animals with temperatures too high to permit of their being tested, with the result that they must be left over and tested later. This leads to increased cost.

(4) According to Bissange, pregnant cows react slightly or not at all in the last two months of pregnancy and likewise cows in the first ten days after calving. My view is that cows will react satisfactorily much nearer than a month before calving, but possibly there is a little more chance of the temperature being erratic after calving, especially if the fœtal membranes have not come away satisfactorily.

(5) The test can probably be interfered with more easily by interested persons than can the other tests.

(6) Animals showing evidence of any acute disease or condition or showing pus formation should not be tested. Most of the foregoing applies to testing under ordinary conditions, but I will just refer to this test again in a few remarks on doping.

The Intra-dermal Test.

We are looking for a reliable test which can be carried out in its entirety by the busy single-handed practitioner and which will interfere as little as possible with the farm routine. We shall find it in an intra-dermal method. Of the various forms of intra-dermal test, reference will be made only to the method of Joseph, to the caudal or anal fold method, and finally to the double intra-dermal method of the General Medical Research Council.

Joseph's method is the most simple. The tuberculin is injected into the skin of the neck without removal of the hair. The reaction in this case is a soft œdematous painful swelling. If the reaction reaches ·3 cm. or more during the third or fourth twenty-four hours the animal is held to be tuberculous. An increase of ·2 cm. and less than ·3 cm. is regarded as doubtful and the animal should be retested on the other side of the neck.

As to the anal fold test—also a single injection method—the Americans, who have tested millions of animals in this way, regard it as being as reliable as any other test carried out alone.

The injection into the anal fold is made about two thirds of the distance from its base. The site has some advantages. It is hairless and with a little experience it can be injected and inspected with comparative ease in most cases. It is claimed that being able to compare one fold with that of the opposite side is an advantage. The folds are not always a pair, and the advantage claimed is in any case over-rated. It is unnecessary to compare the folds to judge a reaction. Measurement and palpation of the injected fold is a more sound plan. Some caudal folds are hard and leathery and they are unsatisfactory for the purposes of the test.

The chief objection to this form of the test is the region in which it is practised.

The reaction takes the form of a swelling which may be hard, or soft and infiltrated with no distinct line of demarcation. It may vary in size from the hardly perceptible to one as large as a human fist. It may be very painful. On rare occasions a slough occurs. During the reaction the skin may appear almost blue.

The first observation is made at or about the 72nd hour and at this time the majority of tuberculous animals will be reacting, but about 1·7 per cent. are reacting at the 96th hour, which are not reacting at the 72nd hour. About ·5 per cent. are reacting at the 120th to the 150th hour which are not reacting at the 72nd or the 96th hour. 2·4 per cent. which are reacting at the 72nd hour are not reacting 24 hours later.

The Double Intra-dermal Test, as its name implies, involves two injections of tuberculin—at least, provision is made for two injections. In the report of the General Medical Research Council, it was indicated that some animals showed such a pronounced reaction to the first injection, that a second injection in such cases was unnecessary. This statement can be carried further, for as one's experience increases, the number of animals which are considered doubtful after the first injection decreases. That is almost equivalent to saying that with sufficient experience one injection may be enough, and I think this is possibly true.

However, in the present stage of my experience I meet with animals which remain doubtful after one injection and the second injection usually removes the doubt.

It might be suggested that the increase in the reaction would go on during the third twenty-four hours if the second injection had not been made. This is certainly not the case in many neck reactions, although after a single injection many caudal fold reactions go on increasing up to and beyond the third twenty-four hours.

As to the skin of the neck as a site for the injection, it wins over the tail in all respects but two (1) It has the disadvantage of being covered by hair ; (2) Its thickness in some bulls makes it difficult to examine for a reaction. Possibly a third objection should be added, but I have had no experience of it, *viz.*, an alleged difficulty in getting at the place when animals are secured by patent yokes. The hair is a nuisance. No one can say it is not easier to work on a clipped area or a shaved one. Shaving appears to irritate the skin of some animals and that is an objection to it. The same objection cannot be raised to clipping, but many owners refuse to have the hair removed, either because they want to show the animals or more often because they mean to sell them in the markets if they react. The clipping would then lead to awkward questions and few men want to brand their herds as tuberculous.

It has been said that such marking might be considered an advantage, but it is a disadvantage until we arrive at the time when testing and branding are compulsory.

Although the hair grows quickly, it is a different colour for months. If clipping were essential it would damn the test as a field test in the present state of the law.

Fortunately, in the vast majority of cases (I speak for my own part of the country and the breeds I handle) clipping is quite unnecessary. One precaution however, has to be taken and that is this :—approximately the same place on the neck must always be used or difficulty will sometimes be experienced in finding the place for re-inspection in the case of small reactions or where there is no reaction.

As to the preparation of the skin, probably wiping with alcohol or washing with a toilet soap are quite sufficient. Certainly anything in the way of a strong disinfectant should not be used.

When the hair is long, if it is moistened and then an ordinary dog comb is pulled through it, it is quite easy to inject the tuberculin through one of the partings.

In the three methods of intra-dermal testing under consideration, the dose is one-tenth of a cc. of concentrated tuberculin. The skin should be searched for nodules before the injection is made.

The double intra-dermal test differs from the method of Joseph in that at the 48th hour, if the case is not very distinctly reacting, a second dose of tuberculin is injected into the centre of the swelling or mark caused by the first injection. The final inspection is usually made about twenty-four hours later when in reactors there is usually a distinct increase in the size of the swelling. If doubt still exists, the case must be seen again after a further twenty-four hours when, in the case of a reactor, the swelling will not have altered much, but in non-reactors it will be distinctly smaller. As to the character of the reaction, the Tuberculin Report says it is, whatever its size, soft, hot, tender and ill defined. I do not think many reactors fail to show some pain when the swelling is handled, but many non-reactors show similar if not indistinguishable discomfort under the same conditions.

As to heat, one's fingers are not always able to detect this. There is, however, usually little difficulty in spotting a reaction by its soft, more or less œdematous feel and its ill-defined outline. It is not as easy to pick up the fold, which often feels as if

it were adherent to the underlying tissue. If an attempt is made to roll the skin between thumb and fingers it does not roll easily. In the case of slight reactions and non-reactions, if the injected place is rolled on to the thumb the boundaries of the spot cannot be easily marked off in the one but they can in the other. In non-reactors any swelling present is hard and sharply circumscribed.

With regard to the use of calipers although they may not be essential, they do sometimes provide useful information. Especially in the beginning, it is an advantage to know that a reaction is rarely associated with an increase in measurement of less than 8 mm., but, of course, a reaction usually involves a greater increase than this.

Systemic disturbance must be looked for in this as with the subcutaneous test.

As an objection to the intra-dermal test it has been said that the technique is difficult to acquire. It is admitted that the test cannot be taught by post as easily as the subcutaneous test in its simplest form. To witness a demonstration is undoubtedly the best way to begin, and that is not peculiar to the question of tuberculin testing, but it is not essential.

The first thing to do is to learn what are the changes which take place in the skins of non-tuberculous animals. This can easily be done in a herd which one has reason to believe is tubercle-free, or by doing a combined subcutaneous and intra-dermal test. When Major Dunkin put me in the way of doing this test we selected two herds, one of which I had reason to believe to be free from the disease—the other was a tuberculous herd. They were tested simultaneously and provided, as was expected, some very useful comparisons. At that time I asked Major Dunkin "what about doubtful reactions?" and the reply was to the effect that doubtfuls are usually reactors. The number of doubtfuls is not large but that reply has proved to be a fair statement of the case. One cannot make as many *post-mortem* examinations as one would like, but of thirty-eight animals examined after slaughter twenty-one reactors showed lesions of tuberculosis, sixteen non-reactors showed no lesions, and one non-reactor showed lesions of tuberculosis. In fairness to the test, it has to be admitted that the non-reactor which showed very gross lesions was acutely ill when the test was applied. She was running a high temperature and was within a few days of death, which occurred naturally from tuberculosis.

There is no doubt that the test is ordinarily capable of causing reactions in very advanced cases of the disease. In fact, in the *post-mortem* examinations made, the cases ranged from those in which the lesions were discovered with difficulty to the most advanced cases imaginable.

The same types of syringe are suitable for each intra-dermal test. For one or two animals a small all-glass syringe will answer the purpose, but when testing numbers of cattle, life is not long enough to permit of the employment of these slippery little things, and the best syringe, without a doubt, is the one I have here and which was recommended to me by Mr. Catmur. It is strong and has a check on the plunger for checking the dosage.

The needles, which are of dental type, should be 17 gauge and that is practically the same as the U.S. 25 gauge.

According to circumstances, and to the taste of the operator, from one-third to half-an-inch of needle should project beyond the nipple of the syringe. Care must be taken that the needle points are not turned or damaged. Even new needles can often be improved by giving them a little rub on fine emery paper or a fine carborundum stone.

When injecting the tuberculin, the fold of skin is picked up and, if a half-inch needle is being used, some operators insert the needle to its full length, then withdraw it half of its length, before injecting the tuberculin, which is then driven partly into the wake of the needle; it has been suggested that the tissues are disturbed less by this procedure and the number of doubtful reactions diminished. I do not know how much there is in the idea as far as the caudal fold is concerned, but I do not think it makes any appreciable difference in the neck test, and for speed and accuracy I favour the shorter needle, which is inserted to the proper depth with very little risk of going wrong and the tuberculin injected without any preliminary partial withdrawal of the needle. The tuberculin must be injected into the true skin and not merely sub-epidermally. The bead of tuberculin can be immediately discovered in the skin. If the longer needle is used it is easy to check its path by slightly moving the syringe so as to tilt the point of the needle toward the skin, when its path can be recognised by pressing over its direction with a finger. When the needle is being inserted it is believed to be an advantage to have the bevel of the point directed outward. When needles choke or break and it is necessary to remove them from the nipple, it is often found that their soft heads are squashed in the fitting. Damage will be done to the threads if an attempt is made to dig them out cold, but if they are gently heated the removal is easy.

Quite recently Col. Simpson called my attention to an improved nipple which unscrews and gets over the difficulty without any heating or trouble.

Now, just a few words about doping:—Lignières says 15 to 20 per cent. of subjects treated with previous injections of tuberculin fail to react. Zabala observed that injections of the usual dose of tuberculin repeated several times at intervals of two days prevent reactions to subsequent doses. Tuberculin gives inaccurate results in cattle which have been vaccinated shortly before with preparations of the tubercle bacilli.

According to Storch, the simultaneous administration of 30 gm. acetanilide will prevent a thermal reaction. Cold water in large quantities, and especially if given just before temperatures are taken, will lead to misleading results.

Cold rectal injections are employed for the same purpose. Where one is testing cattle for dealers on

their farms frequently, it is not difficult to be doping against one's own test. The leave-overs from this week's test may be presented for retest at frequent intervals until they slip through.

Opinions differ as to how soon it is advisable to re-test an animal, and the period suggested as safe varies from one month to sixty days.

In cases of doubt when the subcutaneous test is used it is recommended that a larger dose of tuberculin (from two to five times) should be injected, and as the reaction is likely to occur earlier, temperature taking should start at the 2nd or third hour and go on every two or three hours up to the eighteenth hour. How successful one can be in this way in over-coming doping with drugs and cold water I do not know.

The intra-dermal method appears to have an advantage here because it does not depend on a temperature reaction and because once the tuberculin is injected no-one can interfere with its action. Probably the best plan, when it is possible, is to do a combined subcutaneous, ophthalmic and intra-dermal test in such cases.

There is some difference of opinion as to the effect of the various tests on each other, but it would appear that when all things have been considered the intra-dermal test is at least as safe as the others and it is more convenient.

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To Sum Up:—The ophthalmic test is not worth doing alone. It works better in conjunction with the subcutaneous test than with the intra-dermal test, probably because of the more frequent observations.

The Subcutaneous Test is undeniably a good test and it admits of no argument with an owner. If properly carried out it is efficient for the purpose of rendering a herd free from tuberculosis and of maintaining it free from the disease. I have mentioned a number of factors which, if not carefully considered, may lead to disaster. Its thorough carrying out by the veterinary surgeon means that it will make terrible demands on his time. It is necessarily, therefore, a costly test.

In the case of the busy single-handed practitioner it sometimes approaches an impossibility for him to do the work thoroughly. This difficulty has led in some cases to his falling to the temptation of signing certificates when some at least of the temperatures have been taken by an owner or dealer.

This test involves considerable disturbance of the farm routine, the animals have to be housed for a long time and there are many conditions associated with the animal itself which can interfere with the application of the test. It lends itself more than the other tests to interference by interested persons.

The Intra-dermal Methods involve the least interference with the farm routine, the animals can be turned out to graze in the intervals between the observations and no temperatures have to be taken.

They make the least demands on the time of the veterinary surgeon and there is considerable latitude in connection with the times at which observations have to be made. They can be carried out under practically all conditions in animals of all ages and both sexes

As they do not depend on temperature reactions, this side at least of the doping question is eliminated. They can be carried out more cheaply than the other tests.

The Double Intra-dermal Test is certainly very satisfactory—it is reliable, it is practised on a clean part of the animal and in cases of doubt it has the advantage of the second injection, which usually removes the doubt.

No test will ever be perfect, no operator will ever be perfect, and therefore there will never be absolute freedom from errors, but a cheap, easily carried out and on the whole very accurate test like this offers prospects in connection with the question of tuberculosis eradication which are not offered by any other means so far at our disposal.

References:

Hutyra & Marek; Winslow's *Materia Medica and Therapeutics*; Circulars of the U.S. Dept. of Agriculture; M'Fadyean & Sheather (*Jnl. Comp. Path. and Therapeutics*); Jowett (*Jnl. Comp. Path.*); Varrier Jones & Sims Woodhead (*Jnl. Comp. Path.*); Malkmus, Calmette's *Tubercle Bacillus Infection and Tuberculosis in Man and Animals*; *Tuberculin Tests in Cattle* (Medical Research Council, 1925); Papers lent by Dr. Tuck.

Discussion.

The President (Major G. W. Dunkin): I think you will all agree that we have listened to a very thorough exposition of the subject of tuberculin testing, and I hope the discussion will be a good one. I will call upon Capt. Townson to open it.

Capt. W. K. Townson (Peterborough), who had to prepare his remarks at very short notice owing to the inability, through illness, of Professor Buxton to open the discussion, said:—

In opening this discussion, I should like to congratulate Capt. Motton on his paper and regret it was not printed and circulated to fellows of this Society, as it bears such great evidence of special preparation and care, and it is impossible to discuss it, as it deserves to be, when we are only allowed this opportunity of studying it.

Much literature has been written on the testing of cattle with tuberculin and it has necessarily become a lucrative addition to the general practitioner.

Undoubtedly the great majority of stockowners will eventually have their cattle tested, as they are undoubtedly anxious to have tubercle-free herds, and at present many, although desirous of having tubercle-free herds, are debarred from doing so owing to the serious question of costs. In my own mind, I am convinced that the clearance of herds from tuberculosis is now an established fact and can be carried out successfully.

Re the potency and keeping properties of tuberculin, I would rather not touch upon these matters, as I venture to submit that it is outside the purview of this paper to discuss them, but a tuberculin of fixed potency must be used. This has been ably explained by Prof. Buxton in

the *Veterinary Record* (18th July, 1925) and I do not agree that the date of manufacture would materially assist us.

Subcutaneous Test.—Whichever test is used, the technique and the interpretation of results should be only liable to a small margin of error. I see no point of importance mentioned by the essayist of the interference of the routine work of the farm and ample assistance must be rendered whichever test is being carried out.

I submit that the subcutaneous test is exceedingly valuable and reliable if carried out with the utmost care and attention, but I have no hesitation in saying that in order to carry out the test conscientiously and thoroughly, the temperature should be taken at least three times in twenty-four hours prior to injection. The present system no doubt answers in the majority of cases, but it will let you down occasionally, and such occasion may be one in which a valuable animal may be concerned. I maintain that one cannot attach too much importance to the pre-inoculation temperature.

As regards the post-inoculation temperature, I am in full agreement with the instructions set out by the R.V.C.

I consider the subcutaneous test a good and reliable test, simple in technique, and it has been the means of establishing many tubercle-free herds in this country. The instructions issued by R.V.C. are sent out after many years of careful work, and if these are adhered to I find the test consistently satisfactory.

In my opinion, whichever test is used there is systemic disturbance to some degree in reactors, and greatest in young calves.

I agree with the symptoms as mentioned by the essayist, but, in addition, I have found a great diminution in the milk yield.

I should like to ask if the essayist has met with any cases of tuberculous mastitis after the test, where udders prior to inoculation were apparently normal. This has been my experience in a few cases. I have also observed that what have been apparently healthy cows prior to testing have rapidly lost condition, and, in the course of a few weeks, bordering on emaciation. Of course, I mean in reacting animals. I should like to ask if Capt. Motton has had any similar experience.

On hearing references made by the essayist to various authorities *re* this test, one is inclined to think that the variations in the temperatures tend to make this test less positive.

The essayist remarks upon going long distances to test animals. Personally, I am no believer in proceeding long distances for the purpose of applying any tuberculin test, because in my experience the variation in pre-inoculation temperature, especially in young animals, is so marked that the work will be much better done by a local man who could pay a return visit to the premises if the pre-inoculation temperature is too high. I should be inclined to ask the essayist whether he has any suggestions to make as to how this difficulty might be got over, and one is almost lead to think that this may account for the discrepancy of results between this country and the Argentine. Or is it the case that, having travelled a hundred miles to test an animal, to find high temperature, that the tuberculin is still injected, or does the operator return and go again another day?

My experience is that in young animals, particularly in pregnant heifers, it is at night that the temperatures are usually highest.

In adult animals I think there is a necessity for the definitely-accepted reaction and I contend that no adult cow should be submitted to the test unless the temperature is below 102·4°F. and a rising temperature of 2°F. is sufficient to be called a reaction, and a rise of 1·5°F. should bring the animals amongst the doubtfuls.

It is common to find the temperature of calves 103°F. I do not agree that in young calves, and up to six months, a rise of at least ·9°F. higher than 104°F. constitutes a reactor, and before I came to a definite interpretation I should want to take the pre-inoculation temperature at least three times.

I fail to see the necessity of taking the temperatures at the 6th and 21st hours, as required by the Ministry of Health. I agree with Mr. Male, who states that he has never seen a cow react at the sixth hour, that did not react at the 9th. I find that the variation in thermometers is very considerable. The taking of temperatures should not be entrusted to any other than a capable assistant or the veterinary surgeon himself. The thermometer should be inserted, whether per rectum or vagina, for a period of one minute, and read off and recorded immediately on withdrawal.

Housing of animals is most important, and I am of the opinion that, whichever test is being carried out, animals should be kept up until the test is completed and the results known. Any changes may be then observed more readily. Animals prior to testing should be housed sufficiently long for them to be accustomed to their surroundings.

My only objection to the subcutaneous test is that it lends itself to be tampered with by unscrupulous persons. My experience is that cows will react satisfactorily to within a few days of calving, and also with satisfactory results a few days after calving.

The leaving of thermometers for the taking of temperatures by laymen may probably have brought this test into disrepute. Temperature charts are often misleading and puzzling and too many theories are put forward. Definite instructions should be universally adopted.

Ophthalmic Test.—In my opinion, the ophthalmic test is unreliable when used either alone or in conjunction with the subcutaneous test or intra-dermal test.

The so-called typical reaction, in my opinion, is not typical. It is difficult to determine what is to be accepted as a reaction. I do not agree with the essayist that the best results are obtained by using the ophthalmic disc. In my mind there is a doubt as to the uniformity of dosage. I use a small hypodermic syringe without the needle and drop about four drops on the eye-ball, which is distributed round the eye by the movement of the eye-ball. I fail to follow the essayist as to why the left eye is used. In all cases when applying the ophthalmic test I use the right eye on account of the cow being accustomed to being approached on that side usually both for feeding and milking, and she is more easily held by an assistant because, as a rule, one holds the animal with the right hand.

I should like to ask the essayist as to whether he has, in his experience, had any reaction from the ophthalmic

test when used in conjunction with the subcutaneous test or the intra-dermal test, when no reaction whatever has resulted from either the subcutaneous or intra-dermal test and on *post-mortem* examination the animal was found to be free from tuberculosis. This I have observed in two cases recently.

Capt. Motton mentions that reactions are indicated by lachrymation, redness of conjunctiva, possibly swelling. It is not my experience to find swelling. I have observed little or no lachrymation when muco-purulent discharge was present and only slight evidence of conjunctivitis.

I have heard it stated that an ophthalmic reaction has been observed in the opposite eye to the one tested.

I do not think adrenalin is likely to be used by stock-owners to disguise an ophthalmic reaction.

Various causes, to my mind, make this test unsatisfactory, After the application of tuberculin most of it is washed out by profuse lachrymation, the action of draughts, cold wind, sunlight, flies, dust, foreign bodies, the animal rubbing the tested eye, or removal of discharge by interested persons.

It has been claimed by the essayist that the caudal fold site has some advantages. I have not found that it has any advantages, or it may be that I am not sufficiently experienced in applying the test in this situation. I think it is difficult to take satisfactory measurements and one frequently injects subcutaneously and not intra-dermally owing to the thin nature of the skin and there is a soiling by fæces. I have observed a septic condition with swelling and subsequent slough at site of injection in reactors.

Double Intra-dermal Test.—Capt. Motton has dealt with this so fully in every possible point that it leaves little room for discussion.

I think both clipping and shaving are unnecessary, and the removal of hair for about a space of a square inch with a pair of curved scissors is all that is required. The site would not be seriously interfered with by the yoke whichever pattern is used.

I find all reactors show discomfort and pain when the swelling is palpated. Pain and discomfort materially assist me in determining what is a reaction. The average measurements of a fold of skin of cows appears to vary from about 4 to 8 mm., the smallest measurements being of Channel Island breeds. The fold of skin in bulls may be as much as 15 mm. I have seen an increase in thickness in reactors from ten to as much as seventy mm.

Measurements which can only be ascertained accurately by the use of calipers are useful for purposes of record and are required by the Ministry of Health (Form A).

The character of the swelling is, to my mind, much more important than the size, and in non-reactors even if the increase in thickness should be three times the normal, the site remains hard, cool, well-defined, and in no way sensitive. Heat can usually be detected if the back of the second finger is used by placing it on, or about, the seat of inoculation.

This test, in my opinion, is most useful for application to quite young stock and should be more frequently taken advantage of by stockowners. They would be saved considerable trouble and expense by disposing of reactors before they reached the adult stage, and so would be of great value economically.

I endeavour to have two assistants to help me to carry out the testing operation. I like to have the cow removed from the standing and secured by the head with a halter, and barnacles may be applied. The usual cowshed is not a convenient place in which to perform this operation. It is not too well lighted, the mangers and hay racks being generally in the way, and there is, to my mind, a risk to the operator. I see no advantage in applying this test at lightning speed.

The application of the double intra-dermal test requires the utmost care, and considerable practice and experience is necessary before constant results are assured.

Many types of syringes are in use but few are suitable, and I am in full agreement with the essayist that the most satisfactory syringe at present is that made by the Dental Manufacturing Co. The 17-gauge needle, however, to my mind, is useless, being too weak and fragile and longer than necessary. I advocate as short a needle as possible, providing it will make the injection sufficiently deep, as I find the deeper the injection the greater the swelling in the tuberculous animal. Some operators favour the use of the curved needle.

I consider that the all-glass syringe mentioned by Prof. Buxton and Capt. Motton unsuitable for the intradermal test. One cannot use the pressure required, which is considerable, without forcing off the nozzle. Frequently you may burst the barrel, or if charged to the full capacity (1 cc.) there is a danger of the piston becoming detached and the tuberculin being lost.

I have used the 1 cc. Record Syringe with good results, with a three-eighths needle.

Mr. J. M. ARMFIELD: Would the essayist tell us what percentage of cattle that react to the test eventually die of tuberculosis? (Laughter).

Mr. F. T. TREWIN: I should like to thank Mr. Motton for his most interesting and descriptive paper on tuberculin testing. I have got, I might almost say, no criticism to offer, as my experience almost entirely agrees with what we have just heard from him in regard to all three tests. I have had a considerable experience of the subcutaneous test, and I think it is a very reliable one. Some years since, I tested a large number of cattle for a local butcher and upwards of two hundred which passed the test were slaughtered, and appeared, I was told, to be free from tuberculosis.

I have not had a very extensive experience of the intra-dermal test, but I have used it on cows that have come under the Tuberculosis Order and I have found it very satisfactory, for every one that reacted proved, on *post-mortem* examination, to be tuberculous. I have recently had some more experience of this test through the kindness of our President, who came down and gave a demonstration on a herd on which I had applied the subcutaneous test for three or four years at intervals of six months. I was led to suggest the application of this test on account of a number of the animals, especially the in-calf heifers, which had previously passed the test, but which, when brought into the yards three or four days previous to the test, had had temperatures which were very irregular, quite a

number being too high for injection. Major Dunkin gave us a demonstration on the whole herd and the comparisons of the results are very interesting, because I did not give him our results until he had given us his. There were 73 animals tested at three different farms, and we included ten yearlings which six months previously had reacted to the subcutaneous test. In each case the latter animals gave a reaction to the intra-dermal test. We had three cows reacting to the double intra-dermal test which six months previously had regularly passed the subcutaneous test. They were part of the herd believed to be tubercle-free and kept at a separate farm from the reactors. On making a *post-mortem* on one of those three animals I found a tuberculous lesion in the mediastinal gland. Five animals passed the double intra-dermal test which either failed or were doubtful to the subcutaneous test, but they were included in this group in which the temperatures had been so irregular that I did not look upon them as being altogether reliable.

What I think about the double intra-dermal test is that it is particularly useful in young animals that have to be brought in from the fields to be housed. It also enables the breeder to pick out the affected animals at an early age, the temperatures of these being so irregular that it is inadvisable to rely entirely upon the subcutaneous test.

In my experience, the ophthalmic test is the least reliable, although I think that when you get a well-marked reaction you generally find on *post-mortem* examination, that the animal is tuberculous. In this test I regard the sixth hour as being a very important time of observation, for I believe that you may frequently miss the reaction if you delay your observation till the 12th or 18th hour. I might mention an incident which occurred just recently. I was asked to apply the double intra-dermal test to a valuable pedigree cow which had been purchased at a disposal sale, forty miles distant, and when I was carrying out the first injection the owner remarked that since the sale twenty of the cows had been tested by the subcutaneous and ophthalmic methods. They had, he said, all passed with the exception of one cow, which had given a reaction to the ophthalmic test. He intimated that it would be very interesting to subject this cow to the intra-dermal test, seeing that she had given an eye reaction, but no reaction to the subcutaneous test. I accordingly did so: at forty-eight hours there was no sign of any reaction whatever, so I gave her the second injection and at the seventy-second hour she had given a well-marked reaction. I think that was rather interesting.

Professor G. H. WOOLDRIDGE: At this late hour it is impossible for anyone to say much on the subject, and it seems a great shame that Mr. Motton should have travelled 600 miles and yet not have his paper properly discussed. However, I would like to make one or two observations. I did not hear Mr. Motton refer to any alteration in the temperatures that might occur during the subcutaneous test as the result of milking, and I think it is rather important that one should realise that milking alone will raise the temperature very considerably. If the temperature is taken after milking during the course of the test it might lead to mistakes.

With regard to the action of tuberculin, Mr. Townson mentioned that it causes a great reduction in the milk supply. I presume that he was referring to reactors only, as my experience is that the injection of tuberculin in the case of non-reactors has no effect whatever on the volume of milk yielded. It is impossible, also, that the injection should cause mammary tuberculosis.

Concerning the interpretation of the test, my experience of the intra-dermal test is so small that I am not justified in making a comparison, but the interpretation of it usually depends upon the sense of touch of the observer.

The interpretation of the subcutaneous test, which is recorded by temperatures which are easily seen, is, I think, very much in its favour, for there is much less difficulty in interpreting the record of a reaction or otherwise to the subcutaneous test than in interpreting the reaction in the intra-dermal test.

Professor J. MACQUEEN: Can the essayist explain in what respect the almost invariable success of the intra-dermal test is so different from the very occasional failure of the subcutaneous test. (Laughter.) The information I want is this: In the one case the tuberculin is deposited in the substance of the skin; in the other case it is deposited in the subcutaneous connective tissue—why should it not give the same result?

Capt. S. R. DOUGLAS: Does testing an animal frequently with the subcutaneous test before it becomes tuberculous lessen the reaction when it does become tuberculous? It does seem occasionally, after a herd has been tested time after time, that the animals become less and less susceptible to the subcutaneous test, even when they become infected with the tubercle bacillus. In regard to tuberculin, it is a most stable substance as long as it is undiluted, but when diluted with saline it becomes unstable. I think that at present, in practice, we cannot standardize tuberculin accurately. Tuberculins come under three heads. One set are so below standard strength that they are useless for testing, others are about the Frankfurt standard and one, that which Professor Buxton has been using, is two or three times as strong as the Frankfurt standard.

A MEMBER asked Mr. Motton if he had had any experience of testing cattle after they had been inoculated against contagious abortion. He had a herd which he had tested three times: the last time he had three reactors. In the meantime, the non-reactors had contagious abortion rather badly. When he tested these again there were fifteen standing in one byre where the contagious abortion had taken place, and ten of them reacted. That was about three weeks after he had finished inoculating them with the contagious abortion vaccine. Also did not the essayist think that it would be far better if more calves were tested instead of leaving it until they were adults? It would mean less expense in getting rid of the reactors and less risk of spreading the disease.

Major G. REES-MOGG: Has the essayist ever applied the eye test when he has taken the first temperature? I have had rather bad results from the eye test and whenever I do it I always do so when I take the first temperature. You will often find that at the third and sixth hour you will have a lot of discharge and that at the ninth hour it has disappeared altogether.

The Reply.

Capt. Motton, who had only time to deal very briefly with the points raised in the greatly curtailed discussion, said in reply:—I am very grateful, first of all, to Mr. Townson for having kindly undertaken the opening of the discussion on this paper in the absence of Professor Buxton, who is unwell. He has taken on the task at very short notice and, in the time at his disposal, he has gone into the matter very thoroughly. He has been very kind, especially in amplifying the paper. Early in his remarks he made some mention of cost, but there is no question about the intra-dermal test being the cheapest test. It is often impossible for a single-handed practitioner thoroughly to see the subcutaneous test through himself. Compared with the subcutaneous test from the standpoint of accuracy, there does not appear to be more than a decimal point either way. With regard to the routine, I think Mr. Townson said something about one's wanting as much help in the one test as in the other. It may be so, but the help you require in the intra-dermal test is next to nothing, if my experience with Guernseys is any guide. One man is enough to help, and if you go quietly about it, most of the animals take little or no notice.

As to the variations in the dose of tuberculin I know nothing about them—we have to take the advice of the laboratories which supply the stuff. Concerning the occurrence of mastitis during testing, I have seen this in connection with the intra-dermal test and also in connection with the subcutaneous: it is there before you test, of course, and is gingered up during the reaction. With regard to long-distance testing, I think perhaps the subcutaneous is the best test under these conditions if the first temperature is all right for making a start. *Re* temperature charts and what elevation of temperature should be regarded as a reaction, I pointed out that there was a great deal of difference of opinion on the point. What I think we have got to do is to take the formula of one or other of the Commissions or authorities and be guided by that. With regard to the temperature in calves, I quoted Hutyra and Marek, who do not advise the testing of calves under six months old subcutaneously, and I do not propose to do so unless the owner insists. As to the dose of tuberculin in the discs, we are told that there are so many fractions of a gramme in a pellet, and I am afraid that has to be accepted.

I certainly do not think that you need house animals for the intra-dermal test. Americans favour this test because they can do it on range cattle which are loose. A point was raised in regard to the attendants making observations on systemic disturbance. We do not pay any attention to what the attendants say.

With regard to the skin of the anal fold being too thin: there is no difficulty about it—it is easy to feel the bead of tuberculin in the skin, but I do not like the tail end of the animal. Concerning the patent yokes, I have not experienced that objection. With regard to pain, I think I said that nearly all reactors show this pain, but that other animals appear to show pain, too.

As to the measurements of reaction in the skins of Channel Island cattle, I think Mr. Townson said the normal thickness was usually about 5 mm. Guernseys are usually six or seven, some are eight and a few are more. With regard to the method of control—so far as the eye test is concerned, I like the left eye best in loose animals because I can work better with my right hand.

Concerning Mr. Stowe's remark about abortion, it is a strange coincidence that Major Dunkin and I tested animals, every one of which had been inoculated with abortin, and there was no reactor amongst them. I do not see why there should be.

I did not say that any test was invariably accurate, and any explanation of the points raised by Professor Macqueen is beyond me. I am very grateful to Captain Douglas for his amplification of the paper, especially in regard to the standardisation of tuberculin. As to the use of ophthalmic tuberculin in the manner mentioned by Major Rees-Mogg, it is one of the American methods, but I do not like the test. As to how many animals die from tuberculosis after reacting—I am afraid my clients' animals are disposed of before they reach that stage. Professor Wooldridge referred to the relationship between temperatures and milking. I did mention something about that, as far as the taking of temperatures in connection with the subcutaneous test was concerned. The fact that a temperature chart can be easily challenged is admitted, but the subcutaneous test has so many things which may vitiate its results that I think the intra-dermal test has the advantage. I would prefer to risk a little inaccurate judgment, perhaps, and no interference than what might be a better test but for the possibility of interference.

Professor Wooldridge in proposing a very hearty vote of thanks to Capt. Motton for coming up from Penzance to give them that interesting paper, and for the enormous amount of time which he must have devoted to its preparation, said that the benefit to be derived from it would not be limited to those proceedings, and that he was quite sure that the copy of the *Record* in which the paper appeared would be very carefully guarded by all for future reference.

Notanda.

Hogs that harbour the parasite of trichinosis show no symptoms, and pork containing the parasites looks exactly the same as other pork. The heat of cooking destroys the parasites, and well-cooked pork is safe for human consumption. (*Vety. Med.*)

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The Fallopian tubes, aqueduct, artery, etc., derive their names from Gabriello Fallopius, Italian anatomist, born in 1523 at Modena.

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The largest ovarian cyst on record was removed by Dr. Elizabeth Reifsnyder, of Shanghai, and contained 100 litres of fluid. The patient recovered.

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Iodine was discovered in 1812 by B. Courtois when investigating the products obtained from the mother liquors prepared by lixiviating kelp or burnt seaweed. In 1815 L. J. Gay-Lussuc showed that it was an element.

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Iodine found in marine plants is more effective than inorganic iodids in the treatment of thyroid defects. Marine-plant iodine is probably in a colloidal form and therefore slowly absorbed.

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Weil's disease, acute febrile jaundice, infectious jaundice, or epidemic catarrhal jaundice, was described by Adolf Weil (1848-1916) a Wiesbaden physician.

The Veterinary Record.
19th March, 1927.

THE TUBERCULIN TEST.

Captain S. J. Motton's paper on the above subject, together with the discussion, reproduced in this issue of the *Record*, will be read with great interest, not only by those veterinary surgeons commonly practising the tuberculin test in one or more of its forms, but also by those who have not hitherto advised its routine use. By the former, this paper will be recognised as a very valuable and concise summary of the facts concerning the test, by one who is evidently a keen observer, who has gained his experience by numerous tests under the ordinary conditions met with in general practice, while to the latter it should act as a stimulus and induce them to take their share in the beneficent work of freeing our herds of this veritable scourge. Although it may be contended that reacting cows are just transferred from one herd to another and that the incidence of tuberculosis is not lessened, it is overlooked that these cows are gradually collected up into a few herds where probably all the cows have reacted and therefore they cannot infect healthy ones, also that the educational value of a healthy tubercle-free herd is of immense benefit to the locality generally, leading to an all round improvement. When owners see the economy effected by eliminating tuberculous cows they very soon follow suit.

Until graded milks were introduced the farmer saw little incentive to providing tubercle-free herds, as he had to compete with others who took no precautions either to have a healthy herd or to produce a clean milk. Now that the public can obtain, at very little extra expense, a guaranteed milk and the farmer gets just about sufficient extra remuneration to pay for the extra labour, for the expenses of obtaining a tubercle-free herd and for proper appliances for producing a clean milk, an increasing demand will be made for this article, so that gradually the general standard of the milk supply will be raised, which is the desire of all those interested in public health.

The Milk and Dairies (Consolidation) Act also makes it compulsory for the dairyman to improve his buildings, and his methods of milk production. The full effects of this will not become apparent for some years, as time must be allowed for such far-reaching—but too long delayed—reforms.

The veterinary surgeon must be prepared to advise and assist in this good work, especially in the testing and gradual elimination of tuberculous cows. What method of testing shall be advise ? All will probably agree that the ophthalmic test may be discarded. As a single test it is unreliable, and in conjunction with other methods it is only occasionally useful and therefore an unnecessary expense.

The subcutaneous method has stood the test of time : given a good tuberculin and the necessary leisure on the part of the operator, it is undoubtedly a most reliable test, especially when employed on a herd that has not been tested previously. If sufficient interval is allowed between the tests and care taken that all those animals that react are rigorously excluded from the herd immediately, then it can be relied upon to produce, in a reasonable time, a tubercle-free herd. If the axiom " once a reactor always a reactor " is kept in mind, there will be very few failures.

A great deal of discussion has arisen as to variations in temperature of cows under the test. This need not unduly alarm the operator, for if careful observations are made when the temperatures are being taken and due allowance is made for slight variations, a very definite opinion can be arrived at in nearly all cases. The cows can be turned out, watered and milked at their usual times. Any variations in this rule will be much more likely to cause erratic temperatures than if the cows are allowed to follow their usual mode of life. Pre-inoculation temperatures are of great assistance and these can be taken by the owner, which will be a saving of expense. Most practitioners will probably agree that the rules laid down by Sir J. M'Fadyean are to be relied upon in practice, and, if followed, will lead to very few mistakes.

If there are any doubtful reactions, the intradermal test can be applied immediately—also to any cows whose temperatures are abnormally high at the time of the test.

As was pointed out in the discussion, the great advantage of the subcutaneous test is that a temperature chart can be so much more easily read than the record of an intradermal test, which depends so much on the human element, *i.e.*, on the skill of the operator, his experience in interpreting the character of the swelling, and even on the type of instrument and needle he uses. A purchaser can himself read a temperature chart and draw his own conclusions, but he must rely absolutely on the experience and skill of the veterinary surgeon in the case of the intradermal test. For this reason it will never supersede the subcutaneous for many tests, though

it will prove a great boon to the busy single-handed practitioner, who makes a careful study of its application; also, it will be especially useful in testing young animals the temperatures of which are sometimes somewhat variable, and remove the necessity of housing them and tieing them up—the excitement of which might cause a rise in temperature. It is claimed that cattle can be tested more frequently by this method, also that reactions are obtained in animals badly diseased which might not be given to the subcutaneous test, but it is probably too early to say whether these contentions can be upheld. After thirty years' experience of the subcutaneous test its very occasional failures are known and well advertised, but with the intradermal test, more experience is required of its application in the field under ordinary farm conditions before one can claim that it is more reliable. As Professor Macqueen very tritely asks "in what respect is the almost invariable success of the intradermal test so different from the very occasional failure of the subcutaneous test?"

There is no doubt that the double method of application is a great improvement on the single injection, and when carried out with proper appliances and by skilled and experienced operators, it is a most reliable test and can be recommended with the greatest confidence.

In order to obtain the best results with any of these tests it is most necessary to obtain reliable tuberculin. There appears to be still room for doubt as to the efficacy of some brands still on the market. Even if tuberculin cannot be standardised, its reliability should be guaranteed by frequent tests under Government control.

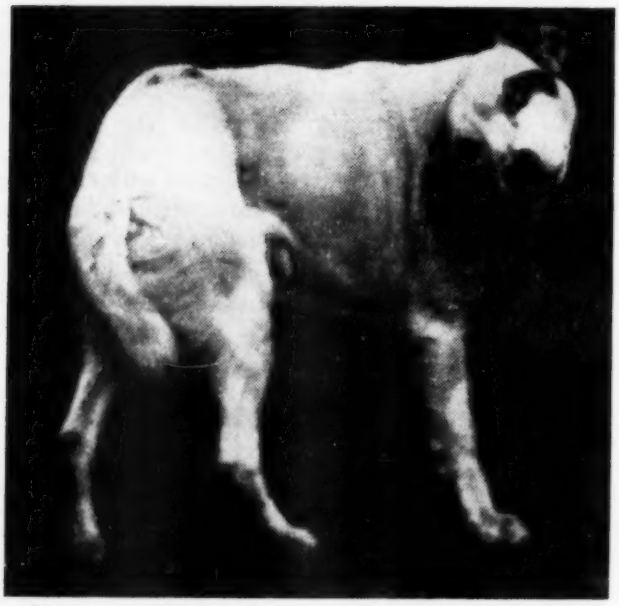
CLINICAL AND CASE REPORTS.

Cranial Hæmorrhage.

By Frank Chambers, O.B.E., F.R.C.V.S.,
Wolverhampton.

A six-years'-old Fox terrier was one afternoon following his master down the garden path when a pole which was being carried on the shoulder of the latter slipped off backwards and struck the terrier behind the left ear. It stunned the dog and blood was seen to be escaping from the left ear. He soon regained consciousness but carried his head rotated on its axis, so that the right ear was uppermost. No improvement being manifest, he was brought to me for treatment. The dog could walk but he always turned to the right. If he was lifted from the ground he would twist in all directions, and it was only with difficulty that one's grip on the dog could be maintained. It brought to my mind so vividly the symptoms shown by the pigeon after the classical operation of the removal of its cerebellum, that with assurance I diagnosed fracture of the skull with a hæmorrhage in the region of the cerebellum. After keeping the dog for a few days to exhibit to several medical friends, he was destroyed.

Post-mortem. Although I opened the skull as carefully as possible, I was unable to detect a fracture. I may have cut into the actual fracture with the bone forceps. A large amount of dark-coloured blood in liquid state escaped when the membranes were incised. This was especially plentiful in the region of the cerebellum, on the left side. The accompanying photographs, which are not very good, do show how the head was carried.



White Heifer Disease.

By W. F. Aston, M.R.C.V.S., Shrewsbury.

A Shorthorn heifer, pure white colour, was born on January 3rd, 1925, the dam being a dark roan, and sire a light roan. She was well grown and in very good condition when first put to the bull on January 22nd, 1927. It was noticed that she bled slightly after service, which otherwise appeared normal to the stockman.

On February 19th she was observed to have her back arched and to be uncomfortable; on the 21st she commenced to strain violently. She was examined the following day, and when seen was stretched out at full length with violent straining spasms every minute. After forty to sixty contractions she would become quieter for an hour or two, probably through exhaustion, only to start again. She was given three grains of morphia, but it had no appreciable action on the pains. Tinct. opii in half-ounce doses at regular intervals did not give relief.

An examination per vulva showed a very dense hard mass, some four inches inside, with ridge-like bands of persistent hymen crossing the surface of the mass. Per rectum was felt a very dense mass, of the full extent of which one could not get one's hand around, owing to the pressure on the bowel passage.

Her temperature was normal, appetite *nil*, respirations hurried, and she wore an anxious espression even when there were no pains. There was no change in her condition up to the 24th, and she was slaughtered.

Post-mortem showed a broad junction of vagina and vulva just anterior to the urethral orifice. In the thinnest part it was about a quarter of an inch thick. The vagina was filled with a glycerine-like, white, mucoid fluid, odourless—total quantity about one and a half pints.

The cervix appeared normal except that it was more patent than usual; womb slightly distended with the muco-gelatinous fluid, left ovary normal, right ovary one large cyst, fallopian tubes normal.

When cut open and examined on the table, a hole was seen on the posterior side of the band which allowed the passage of a track probe under the vaginal mucosa a distance of some six inches. I am of the opinion that this occurred at service.

A further case at another farm, in a heifer twenty months old, showed similar symptoms five days after being bulled. In this case the wall was very strong, and despite reasonable attempts to break it down it still persists. The vagina, in comparison to the previous case, would only contain half a pint of fluid, the cervix and womb could be detected per rectum apparently normal. After several three-grain hyperdermic injections of morphia this heifer became easy, the appetite returned, and she has apparently recovered although the fluid has not been liberated.

Williams *Diseases of Genital Organs*, page 169, *et seq.*, suggests operation as simple. Muller and Dollar, in *Veterinary Surgery*, page 683, report three cases, and suggest puncturing and distending the opening. While of the opinion that relief could be obtained fairly safely by puncture with trocar and canula, I have great doubts that the enormous scar tissue would be a most serious item in delivering at the end of pregnancy.

Radiating or Star Fracture of the Scapula.*

By R. E. C. Dowling, London.

Subject: Bay hunter gelding.

History: The horse was found in a cow shed with a small wound situated just below the tubercle of the

* Contributed for award under the N.V.M.A. Clinical Prize Scheme for Students.

spine of the scapula. This healed under the owner's treatment. About three weeks later, an abscess formed at the seat of the wound, and a veterinary surgeon was called in. The abscess was opened and treated, but healing did not take place owing to the formation of a Y-shaped sinus. The two branches of the Y were uppermost, and extended well up into the shoulder, while the stem opened on to the surface at the point where the abscess was opened. The veterinary surgeon then advised an operation and called in a colleague to do this.

Operation: On April 22nd, 1926, the horse was cast and anæsthetised. A probe was then passed up the sinus channel for about four inches, where the division into two channels could be made out quite distinctly. From this point an incision was made extending upwards for about five inches, deep enough to reach the scapula, and taking the direction of the larger of the two branch channels. Exploration of the wound revealed a second sinus deep to the branches of the first. This was about two inches in length, and, like the channels of the other, was lined with dark necrotic tissue.

In the intra-spinous fossa of the scapula, just interior to the cartilage of prolongation and about an inch posterior to the spine, a star fracture could be made out. The fracture was more or less overgrown with cartilage and bone, but a hole persisted in its centre and penetrated the thickness of the scapula. Through this hole, deep to the scapula, a movable foreign body could be felt, but owing to the hole being too small, could not be extracted. To enlarge the hole, trephining was carried out. Then, by means of long forceps, the object was removed, and proved to be a piece of irregularly-shaped necrosed bone measuring about 1½in. by ½in. Further exploration discovered several other smaller pieces of the same substance and all were removed. The cavity occupied by these objects was then well cauterised with pure lysol after the bone in the vicinity had been well curetted. The sinus walls were then cauterised by the same method, and finally the main channel of the outer sinus was opened and cauterised. Three plugs of cotton wool saturated with lysol solution were then inserted into the wound, and held in place by a couple of sutures only, to facilitate easy removal when required next day.

The horse rose voluntarily about ten minutes after completion of the operation, having been under the influence of the anæsthetic for approximately two hours. The amount of chloroform used for the anæsthesia was remarkably small, being only three fluid ounces. On examination, an hour after the operation, the animal was found standing quietly in his stall seemingly little distressed.

After Treatment: The operator advised the veterinarian attending the case to remove the cotton wool plugs next day, reminding him of the number inserted to ensure all being extracted. The cavity was then to be swabbed out with a 5 per cent. carbolic acid solution, and this treatment continued till granulations formed, when the lotion was to be changed for a 4 per cent.

(Continued at foot of next column.)

(Continued from previous column).

solution of alum, and this continued with, while necessary.

Result: On April 26th word was received by the operator, from the veterinarian in attendance, that the case was making good progress. On May 8th a further report stated: "Hole in scapula filled up. Wound healthy. Granulations firm. Case doing very well."

ABSTRACTS.

Comparative Studies on Vesicular Stomatitis and Foot-and-Mouth Disease. (This article is a first report of the Commission appointed by the U.S. Department of Agriculture for the study of foot-and-mouth disease.)

The similarity between the lesions of foot-and-mouth disease and of vesicular stomatitis in cattle led the Commission to make a comparison of the one disease with the other.

It was first noted that the virus of vesicular stomatitis was transmissible to guinea-pigs by scarification of the hind pads. The lesions which resulted were similar to those produced by the virus of foot-and-mouth disease. Primary lesions, however, were usually slower in making their appearance and secondary vesicles were developed in fifty per cent. only of the animals inoculated.

In cattle, it was found that vesicular stomatitis, like foot-and-mouth disease, was characterized by the formation of vesicles on the mucous membrane of the mouth and a marked rise in temperature before and during the appearance of the lesions. The infection was obtained by applying the virus to scarified areas on the tongue and upper lip. Unlike foot-and-mouth disease, the intramuscular and intravenous inoculation of the virus failed to produce obvious lesions.

In pigs the virus of vesicular stomatitis gave rise to a condition indistinguishable from foot-and-mouth disease. Twenty-four to forty-eight hours after inoculation there was a marked rise in temperature followed by the appearance of distinct vesicles on the feet, involving the interdigital space, the coronary band and the heels. The animals showed marked lameness for several days. Vesicle formation on the snout sometimes occurred.

In four out of five horses inoculated by scarification of the mucous membrane of the mouth, severe local lesions developed. On the other hand, six horses inoculated with foot-and-mouth virus failed, in every case, to produce evidence of the disease.

Cross immunity tests showed that guinea-pigs, cattle and pigs which had reacted to the virus of vesicular stomatitis and failed to yield lesions when reinoculated with the same virus, reacted to foot-and-mouth virus of both type (A) and type (O), indicating that the one disease did not immunise against the other. The converse, that animals immune to the virus of foot-and-mouth disease

reacted to the virus of vesicular stomatitis, was also proved.

In a number of filtration experiments it was shown that the virus of vesicular stomatitis traversed candles of the types Berkefeld V and N, and Chamberland L3 and L7. It was retained by a Chamberland L11. In this respect the virus is similar to that of foot-and-mouth disease.

[P. K. Olitsky, J. Traum and H. W. Schoening. *Jnl. Amer. Vet. Med. Assoc.* Nov. 1926. Vol. 23. No. 2 p. 147]. R. E. G.

Foreign Bodies in the Stomach of the Horse.

A horse presented symptoms of gastro-enteritis of a chronic type which did not yield to any treatment. After six months of illness the owner decided to have the animal killed and it was sent to the butcher. After slaughter there was found in the stomach a portion of the branch of a tree 23 centimetres (9·05 inches) long and about the thickness of a finger. The mucous membrane of the stomach was swollen, with some hæmorrhages.

Six months previously the horse, employed in carting manure in an orchard, was in the habit of eating small branches of the trees. While it was doing so, the man in charge of it struck the horse a sudden blow with a whip and the animal swallowed the branch it had in its mouth at the time.—[*Vogt. Deutsche tierärztliche Wochenschrift*, 2 *Mai*, 1925.]

T. D. Y.

Preventive Vaccination against Canine Distemper with the Specific Virus.

Puntoni injected a few drops of an emulsion composed of physiological solution and portions of the cerebrum and cerebellum of a dog dead of the nervous form of distemper, into the brain of two puppies ten days old. These animals died three weeks later after presenting nervous symptoms. By injection of an emulsion of their brains into another dog and then into others, by successive passages he reproduced the nervous form of the malady. The nervous substance of the puppies, which was very virulent, was attenuated, and afterwards used as a vaccine. Young dogs were vaccinated with impunity by 3 to 5 subcutaneous injections of 50 cgms. of the attenuated nervous substance made with intervals of five to seven days. These animals resisted cerebral inoculation with the virus, whereas the non-vaccinated controls succumbed.

The preparation of the vaccine may be made with the nervous material obtained from puppies succumbing to the natural disease.

[Ex *Rec. de Méd. Vét.* 1026, 15 Fév.Tom. C.ii. No. 3, pp. 118-119. From *La Nuova Veterinaria* No. 2, 1924).

H. G.

DIVISIONAL REPORTS

Royal Counties Division.

Annual Meeting and Dinner.

Professor Buxton's Presidential Address.

(Continued from page 245.)

Mr. Trewin exhibited, under the microscope, a slide which he thought would be of interest to the members because of its extraordinary richness in tubercle bacilli. He was making an inspection of a herd of cows under the Milk and Dairies Order a short time previously, and he noticed one cow in the herd which appeared to be coughing more than she should be. The owner did not consider that there was anything wrong with her, but he (Mr. Trewin) noticed that on the wall in front of her standing there was a little sputum which was quite fresh. He collected this on a piece of paper and rubbed it betweeen two slides with a drop of water to thin it as much as possible. He allowed it to dry and then stained it for tubercle, and he thought that on every field of the microscope a very large number of tuberculosis bacilli could be counted. In that bit of sputum, the size of a pea, there must have been thousands of these bacilli. That incident showed how rapidly a cow of that kind must disseminate tubercle bacilli, and how great was the danger of those bacilli getting into the milk; also that veterinary surgeons should pay special attention to the sputum as affording a ready and rapid method of diagnosis. He took the cow under the Order and her lungs were found to be very badly affected. She had also got tuberculosis of the abdominal organs and peritoneum.

Mr. F. W. Willett remarked that the case just described by Mr. Trewin showed how important it was that the wall in front of the cow should be built of some impervious material.

Mr. J. Willett expressed the opinion that the case of the St. Bernard bitch brought before them by Mr Male was most interesting. He could not see, after examining the X-ray photograph sent round at the meeting, that the stifle joint itself was affected: he thought there was a considerable amount of thickening all round it, but not in the joint itself.

Professor Wooldridge said that that was the view he had formed of the case, and he thought it was the view held by Mr. Male himself. As to any line of treatment likely to be successful, he was afraid he could not offer any very helpful suggestions, but the injection of fibrolysin might be tried, as also might massage with some of the forms of iodine which might be got to penetrate. The swimming bath might tend to make the bitch use the limb.

Mr. J. Willett said that if he was going to try to break down the adhesions he would put the animal under morphia and hang it up by its hind legs. He would give two grains.

Mr. Dunn assured Mr. Willett that two grains would have not the slightest effect; he thought he could safely give twelve grains.

Professor WOOLDRIDGE having suggested a four grain dosage, another member said that his experience had been that the less morphia given the better was the effect, and he would give from ¼ to ½ a grain.

Mr. MALE remarked that the difficulty was, even if they did succeed in breaking down the adhesions, to get the bitch to use the limb, and that things would get as bad as they were before.

Major TENNANT: That is where the swimming comes in. It is done with horses with stiff knee joints. It is a method extensively employed by a "quack" at Rottingdean.

The meeting accorded a hearty vote of thanks to Mr. Male and Mr. Trewin for the cases they had brought forward, and complimented Mr. Male and Mr. Dunn on the successful issue of the case of the grafting of the ovaries with the Sealyham bitch.

Forthcoming Meetings.—It was arranged to hold the April meeting of the Division at Oxford, a special meeting in conjunction with the Guildford Division of the Surrey Branch of the B.M.A. at Guildford in May, and the summer meeting at Cambridge.

ANY OTHER BUSINESS.

The PRESIDENT: Under that heading, I would like to make a suggestion. Mr. Harry Lepper is, I believe, the only original member of this Division who remains with us, and, as an act of appreciation of that fact, I would like to suggest that we elect Mr. Harry Lepper an Honorary Associate of this Division. He would have been here to-day, but he is, I regret to say, laid up with the prevalent influenza.

Mr. MCINTOSH seconded the proposition, which was carried with acclamation.

PRESIDENTIAL ADDRESS.

The PRESIDENT, Professor J. B. Buxton, then delivered his address from the chair, as follows:—

May I take this, my earliest, opportunity of expressing my deep sense of satisfaction at the signal honour which you have done me in electing me your President for the forthcoming year, and may I also say that so far as in me lies I will endeavour to maintain the traditions which have been established by my illustrious predecessors. Custom demands that your President should deliver an Inaugural address and that you should do penance by listening to him—I will, therefore endeavour to be brief.

In the days before that mighty holocaust—the Great War—existence generally, and especially professional existence, had settled down to a very humdrum order of things. A spirit of almost monotonous indifference pervaded the national temperament. The advent of the war changed all that, however, and a new spirit was born—a spirit which had been conceived by the knowledge engendered by the strife and turmoil of the period, a spirit which was evidenced by a realisation of things in a more defined perspective, by a subtle instinct that in the critical times ahead something more would be required in the competition for existence. The word "Reconstruction" was freely used by every section of the community. It was a demand for something *new*, not mere addition to, or improvement of, things which had pre-existed. It was employed repeatedly in connection with our own profession, and that it was no empty figure of speech is, I think, very evident when one critically reviews the many changes which have been accomplished during the past six or seven years. We have at last in the "National" an Association which, despite the croaking of the pessimists, has proved that it truly represents the veterinary profession of this country in whatever branch of our science its members may have specialised. Not only has it the will to act on their behalf, but it has acquired the power to make that will effective. Actual evidence of this is forthcoming when one sees local authorities referring to the scale of fees recommended by the National Veterinary Medical Association for part-time and whole-time veterinary officers—deputations from the Associations are not only received but listened to and consulted by Government departments—when the help of the profession is sought by other bodies for the achievement of some object, and when the profession is invited to participate in the meetings of other, hitherto exclusive, professional bodies. These are only a few directions in which progress has been made, but it would have been difficult to visualise these ten years ago. Excellent as all this undoubtedly is, it would be idle to shut one's eyes to the fact that if the spirit of professional *esprit de corps* was more evident, the power of the representative body would be proportionally enhanced. Despite what has been recently written in the *Veterinary Record* by a well-known member of the profession, scepticism, self-abnegation, and silence may be all very well at times, but–given knowledge–broad-mindedness, self-assertion, and well modulated speech are better calculated to achieve. A Napoleon or a Bismarck may, by virtue of an over-weening lust for temporal power, make or mar the destiny of an Empire for a day, but it is the will of the people that invariably counts in the long run. Similarly, a genius may produce a revolution in a foreign country, but his genius dies with him. No, it is the contribution of a little by many that lays a sure foundation and erects thereon a lasting monument to the glory of a people. Woe betide a nation or a profession which basks in the reflected glory of an individual! It is only by united effort that the well-being of this, or of any other profession, can be assured.

Enormous strides have been made during recent years in surgical technique. Any suggestion of empiricism is rapidly being exorcised from our therapeutic practices and new fields are constantly being explored and the results applied to everyday treatments of disease.

Public health work is providing an ever-increasing demand for trained veterinary officers. The creation of Institutes for research into animal diseases, and the appointment of veterinary advisory officers, both of which, and especially the latter, will be yet more numerous, will provide a constant demand for young graduates who are specially fitted for that branch of veterinary science.

The demand for our services is based almost entirely upon economic considerations—the greater our worth the more we may expect to receive. If the general improvement in conditions of which we are sensible is to be maintained, or carried further, we must, as a profession, equip ourselves to meet those conditions. It may well be that in the interest of future generations of veterinary surgeons, some alterations may soon have to be made in our curriculum. There is a limit to the amount of cramming that can be accomplished in a four years' course, and anything approaching that limit must be detrimental both to the student and to his subjects. I am well aware of the difficulties which are foreseen by many in connection with any alteration in the existing course, but difficulties can be overcome. It must be recognised that the information which has to be imparted to our students is considerably greater in amount and in detail than was the case ten or fifteen years ago, and that it is steadily increasing. If a period of four years was necessary for the course of study in those days it must be quite inadequate now.

However this question is approached, it must be in a spirit of broadmindedness by all concerned, and with a clear perception of the probable future requirements of veterinary surgeons in order that they may be equipped to occupy the position which should be theirs amongst the learned professions.

The farmer of to-day is a very different individual from his predecessors, and the next generation will show a still greater difference. Hundreds of young farmers are taking a degree course in our universities. In addition to the elementary sciences and those appertaining more particularly to agriculture, such subjects as physiology, biology, genetics, general bacteriology, comparative anatomy and veterinary science are taught very thoroughly. Certainly such men make far more satisfactory clients, but they meet the veterinary surgeon more on his own ground and naturally require to know the why and the wherefore of things. They can discuss the various causes of sterility—physiological and bacteriological; they will debate membrane potential and Donnan equilibrium with you, or the phenomenon of adsorption—displacement, as well as the numerical significance of chromosomes in the determination of sex, and various other interesting subjects, and they will certainly take a very intelligent interest in your differential diagnosis.

The enhanced value of livestock in general and the improvement in the conditions under which animal husbandry is carried on have led to an increased demand for the services of veterinary surgeons, especially in connection with disease amongst sheep, pigs, and domestic poultry. Unfortunately, our knowledge of the diseases of these animals is not as complete as we could wish. This is very largely due to lack of opportunity of studying them in the past; but during the last few years appreciable strides have been made in this direction, largely as a result of the work which has been carried out at the research institutes, and it is with an appeal to you, to the profession generally, to afford a greater measure of support to and to take a more lively interest in these institutes, that I should wish to close my address.

The institutes, as you know, have been built and equipped and are maintained by funds obtained from the Corn Production Act (Repeal Act), and dispensed by the Development Commission through the Ministry of Agriculture. The object in view when institutes such as that at Cambridge were started was that stockowners should benefit by the results obtained from the investigation of animal diseases. I have repeatedly asserted that, to my mind, the most satisfactory results can only be obtained by a very close co-operation between the research institute and veterinary practitioners—both in the way of providing material for investigation, in carrying out experiments on a large scale in the herds and flocks under their charge, and in applying and making known to the stockowner methods elaborated as a result of these investigations for the control of disease.

After three years' trial I have frankly to confess that the degree of co-operation in these directions has been very disappointing. This is unfortunate, because it creates a tendency to short circuit the practitioner, and for the stockowner to deal direct with the institute, as he does in the case of those engaged in studying the problems related to animal breeding and nutrition. The work of the institutes must be backed up by the practitioner if the best results are to be obtained for the stockowner.

In conclusion, I would urge that, however well pleased we may be with the progress which has been made during the past few years, we should not rest from our endeavours but rather, stimulated by our knowledge that a little effort ensures reward, redouble our efforts in all directions and so make it a profession worth belonging to and ourselves worthy of the profession to which we belong. (Applause.)

The meeting concluded with the passing of a hearty vote of thanks to the President for his address.

R. CATMUR, *Hon. Secretary.*

* * * *

THE ANNUAL DINNER.

This function, which followed the meeting, was attended by few official guests, and was consequently very informal, but the company, augmented as the numbers were by the friends of the members, spent a thoroughly enjoyable evening, in which the few brief speeches were liberally interspersed with lively vocal items.

Mr. J. W. MCINTOSH in giving the toast of the "National Veterinary Medical Association of Great Britain and Ireland," said that it gave him very great pleasure to submit their noble selves. As they knew, that Association was practically reconstituted seven or eight years ago, and it was with very considerable difficulty that they were able to get things going. At that time the essential spirit in the movement was their President that evening—Professor Buxton (Cheers), and, as one who helped—or, at any rate, tried to help him in his efforts during that period, he could speak with knowledge in regard to the great

amount of time and energy and (he thought it correct to say) money which Professor Buxton had expended in endeavouring to get the " National " Association going on a proper basis.

He did not wish to dwell on those difficult times which they experienced during the first two or three years of their reconstitution, but he felt he ought to say that the profession itself showed a considerable amount of apathy and did not take the matter up as enthusiastically as it might and should have done. Nevertheless, those of them who were associated with the " National " at that time felt it their duty to hold on and they now had their reward in the knowledge that the Association to-day was on a very firmly-established basis. (Cheers.) They were building up a substantial reserve fund, and he thought that they could safely say that the " National " had become a sound and an important institution for the good of the profession. It now remained with the profession throughout England, Wales, Scotland and Ireland to support the Association in its efforts to promote the welfare of the profession as a whole. He gave them the toast " Success to the ' National,' " coupled with the name of Colonel Simpson, who had been an ardent supporter of the movement since its inception. (Cheers.)

Lt.-Col. P. J. SIMPSON, in response, thanked Mr. McIntosh very warmly for the kind words he had used in regard to the N.V.M.A. As Mr. McIntosh had said—and he could only reiterate his remarks—the " National " was now a very live association indeed, and was closely guarding the interests of all classes of the veterinary profession : the inspector, the practitioner—whatever the particular interest of the member might be, all might rest assured that it was being thoroughly well looked after. In regard to the work of the " National," if one had not been intimately associated with it one could scarcely estimate either its nature or its extent. Nearly three times weekly some committee or other of the Association was meeting, and it was at those gatherings that important questions were discussed and conclusions arrived at that were little known to those who were not serving on the committees.

The proposer of that toast was Chairman of the Finance Committee, and he thought he would agree with him that sometimes they had a little wordy warfare over the matters that came before them (laughter)—he mentioned that just to show that everything pertaining to the finance of the Association underwent the most careful consideration and scrutiny. There was a tremendous amount of work done by the Association—done willingly by many men, some of whom were present with them that evening, but none of them had served the Association better than their President and the proposer of the toast. (Hear, hear.) He thanked them for the way in which they had received the toast, and the proposer for the very kind and interesting remarks he had made in regard to the Association.

Major F. J. TAYLOR submitted " The Royal Army Veterinary Corps," saying that he presumed he was asked to do so because he was perhaps one of the older members of the R.A.V.C. Territorial Force. He would like to refer for a moment to the old days of volunteering, when he first joined thirty years ago. At that time, as they knew, there was no Army Veterinary Corps, and they joined as officers and were attached to the regiment. He took commission in 1898, and joined an artillery brigade, *i.e.* the Worcestershire and Warwickshire R.F.A. He was a veterinary lieutenant in those days, and had to provide his own uniform, which cost him £180 : they all wore gold lace, and cocked hats on parade, and he thought he was often taken for a General. (Laughter.) Those times had gone, and when the Territorial Force came into being, different regulations came into force, and officers are now paid, like members of parliament, with corresponding bad results in many cases.

During his volunteer and territorial service he had the honour, when he first obtained his commission, of being presented to Queen Victoria, and afterwards to King Edward, and twice, during the war, to King George, which he thought were unique experiences for a veterinary officer, and of these he was naturally very proud. (Hear, hear.)

When the war came, they had to give up their practices, and when they came back there was an empty cupboard, for many of them. He was sure that all members of the profession would be surprised (and he said it without hesitation) when they looked down the Army List, to find that Territorial officers had not received *many* decorations after their names, in comparison with Regular veterinary officers. He had very great pleasure in coupling with that toast the name of Major Townsend, a Regular officer, who would probably give him a good " dressing down " for what he had said (laughter) and would probably assure him that that auxiliary veterinary officers would be better treated in the next War, if there were then any need for veterinary services.

Major C. H. S. TOWNSEND, in the course of his reply, said that, on behalf of the Corps to which he had the honour to belong, he would like to thank Major Taylor said that on behalf of the Corps to which he had the honour to belong he would like to thank Major Taylor for the terms in which he had proposed the toast, and the officers of the Division for inviting him to the dinner. He thought it was a pity that it was not possible to arrange a closer liaison between veterinary officers and civilian practitioners by means of meetings such as they had had that day. (Hear, hear.) They in the Service were rather inclined to look at everything from an Army point of view and not from that of the practitioner, and he was sure they could only benefit by being present more frequently at meetings of practitioners.

They always realised that it was largely due to the help given by the civilian practitioner that the R.A.V.C. did so well in the late war, and he knew that they would have to call upon him again for his help in the event of another war on a large scale, and he was sure that help would be forthcoming.

He very greatly regretted that Colonel Anthony, their D.D.V.S. at Aldershot, was not able to be present that night, as he was sure that he would have responded to that toast much better than he could hope to do that day. He (Major Townsend) was only a comparatively junior member of the Corps and felt the responsibility which had been placed on him that evening in responding for the whole Corps, but never-the-less it had given him great pleasure at being present to do so.

Mr. J. H. SHEPHERD proposed "The Royal Counties' Veterinary Medical Association," saying that he understood that that Division of the N.V.M.A. had had its Annual Meeting for over forty years in that same hotel, and in the same room. That was the first time that he had had the honour of attending their meetings and he must thank them for the hospitality they had extended to him that evening. He wished the Society every prosperity and coupled with the toast the name of Professor Buxton, its President.

Professor J. B. BUXTON, replying, thanked Mr. Shepherd for the way in which the toast of that Division had been proposed. He must confess that he found considerable difficulty in replying in what he should deem to be an adequate manner. That Division was indeed an old Association, and his predecessors in the presidential chair had been many. It was something like 43 years ago that that Association was started, when Mr. G. A. Lepper, of Aylesbury, was elected its first President, while Mr. Sydney Slocock was its second. (Hear, hear.)

They were fortunate in that they still had with them Mr. Harry Lepper, one of the original members. (Cheers.) Not only had the Presidents of the past been illustrious men, but those who had contributed to the deliberations of the Association had been no less so: they had had papers by Walley, Pritchard, Axe, and Hunting. That Association had always flourished and he was pleased to be able to tell them that it was continuing to flourish. (Hear, hear.) He was coming prepared to tell them that in Sir John Moore they had enrolled their 71st member, but that afternoon they had received the nominations of two additional members. That showed that the Association was doing its duty and was still attracting members of the profession to its ranks. It was playing an important part as a Division of the "National," and he would urge it to continue its efforts in that direction.

One could not help but be impressed by the keenness and the enthusiasm displayed by the members, both collectively as a Division and as individuals anxious to further the welfare of the Association and of the profession. One found every member taking an interest, and that was the proper spirit—the spirit which made for an augmented membership. (Hear, hear.) He only hoped that the coming year might be as prosperous to the Division as the past years had been, and also that they would be able to secure yet more members. It was of more than ordinary importance for them to do this, for if they could only increase their membership by twenty-eight they would be entitled to another representative on the Council of the "National," and he thought they would all agree that that was highly desirable.

North of Ireland Division.*

MR. ARTHUR GOFTON, ON "MEAT AND MILK CONTROL."

"Meat and Milk Control" was the subject of a lecture which was delivered at Queen's University, Belfast, on 15th November, 1926, by Mr. Arthur Gofton, F.R.C.V.S., chief veterinary inspector, Edinburgh, on the occasion of a meeting held under the joint auspices of the North of Ireland Veterinary Medical Association and the Belfast Medical Students' Association.

Mr. J. EWING JOHNSTON, M.B.E., M.R.C.V.S., president of the Veterinary Association, referred to a deputation which at one time approached the university authorities to urge that a school of veterinary science should be set up in the university. The suggestion was, he said, received sympathetically in the face of insurmountable financial difficulties, and he could not be accused of being unduly optimistic when he expressed the hope that, with the co-operation of the present energetic Vice-Chancellor, and the all-important encouragement of the Ministry of Agriculture, the spark kindled on that occasion might burst into flame. Mr. Johnston also spoke of the benefit to the profession of the laboratory set up by the Imperial Secretary's Department, and said the profession regarded with dismay its transfer from the university to its present position of splendid isolation. In asking the Minister of Agriculture to take the chair, Mr. Johnston said that Mr. Archdale was "the right man in the right place." (Applause).

The MINISTER OF AGRICULTURE said he was pleased to attend that meeting, because his Ministry and the veterinary profession were bound up together, and also because he would have the privilege of listening to one of the greatest authorities on meat and milk in the British Isles. The Ministry helped along the veterinary profession as much as they could, because, under the Diseases of Animals Act, they were trying to eradicate the scheduled diseases. By the Bovine Tuberculosis Act of 1925, they were trying to eradicate open tuberculosis among Ulster cattle. From what the lecturer would tell them they would realise that that would be a difficult job. He hoped the veterinary profession would get over its dismay at the transfer of the laboratory to its "splendid isolation" at Stormont. Mr. Johnston would find there that the officials would work in entire harmony with any veterinary surgeon and with Queen's University. (Applause).

MEAT AND MILK CONTROL.

Mr. ARTHUR GOFTON next presented his paper, which was as follows:—

In responding to your request to discuss this subject, I have experienced some difficulty in deciding how to

* Received on 18th January, 1927.

approach it. It is obviously impossible, in the time at my disposal, to discuss detail and I can only deal with the subject on general lines. I am a stranger in Northern Ireland and I cannot claim any personal knowledge either of your law or of your practice in relation to those special branches of public health work which are concerned with the inspection of meat and milk. My remarks, therefore, must not be regarded as in any way critical of prevailing conditions, I am mindful, however, that a year ago I had the privilege of listening to the evidence submitted by your representatives to the Departmental Commission on Government Administration in Northern Ireland and of supplementing it with my own testimony. What I then heard, in conjunction with your request that I should now, in a more public manner, discuss this subject, leads me to assume that individually, and collectively as an Association, you are moved by a desire to influence legislation or the method of its application in the control of two of the most important articles of human food in a manner which will operate to the benefit of the Community of which you form a part.

To say that the object of Meat and Milk Control is to exclude these articles from human consumption when they are either diseased or unsound is to state an obvious fact. But in their broadest sense they ought to do more than that. Properly organised and efficiently performed they should also ensure the hygienic handling and distribution of these two substances as well as of all products manufactured or prepared from them, so that they may reach the consumer in the best possible condition. It should not be forgotten that careless handling entails a risk of contamination or infection which may transform a food substance, primarily sound and free from taint of disease, into a positive danger which generally is so much the greater because unsuspected. Milk-borne scarlatina and the infection of meat and milk with bacteria of the food poisoning group may be cited in illustration. Both infections are contracted, in the vast majority of cases, in the course of handling and preparation and neither gives rise to visible change. They remain unsuspected, as a rule, until their wide-spread and often serious effects are produced. And both are preventible.

In an agricultural country like Northern Ireland, which is fortunate in having a surplus of agricultural produce for export, the efficient inspection of meat and milk assumes a great importance from a commercial as well as from a public health point of view. It cannot be denied that ability to secure the best markets for the disposal of surplus produce must exercise a vital influence on the prosperity of the agricultural interests involved, and these in turn will react on the general community. It must also be admitted that the mere penetration of markets is insufficient, they must be secured and maintained in the face of any competition which may be encountered.

The most accessible and possibly also your best market is located just across the Irish Channel. Without exhausting its needs, it can absorb the whole of the surplus produce of which you may have to dispose. It is a constantly expanding market. It is also a market in which keen competition is waged to secure the maximum of trade and to hold all that is secured.

During the last few years it has been my privilege to visit certain European countries which are competing in the English market to secure trade in farm and dairy produce. I have had the opportunity of studying the organisations which these countries have built up for ensuring the efficient inspection of meat and dairy produce intended for export. They are state controlled and whilst they take full cognisance of the interests of their own home consumers they are vitally influenced in their methods and activities by the requirements of purchasing countries. It is an essential part of their function to secure first hand knowledge of these requirements as laid down by law or by regulation and to act up to them in the letter and in the spirit. The majority of the officers who carry out the duties of inspection are appointed locally, but they must possess the scientific training and qualifications which are specified by the state, and the state retains the right to veto any appointment or to require resignation in the case of unsuitability. In short, no effort is spared to eliminate risk of inefficiency or negligence.

These organisations are not concerned solely with the exclusion of the diseased and unsound, but they include a system of control which is connected more particularly with the purely marketable qualities of exported produce. The market requirements of each country are carefully studied and standards have been established with which exporting houses must comply under penalty of revocation of the licence permitting export. In addition to protecting the home consumer, their object is to ensure the marketing of sound produce of uniform quality in the best marketable condition in order to secure and to maintain the confidence and continued custom of foreign purchasers. In this connection, Northern Ireland cannot afford to be behind her competitors. She should aim to lead and not to follow. As a result, advantage can scarcely fail to accrue to her citizens. Trade is likely to be influenced in her favour and it cannot be doubted that a properly organised system of control will operate to the benefit of her own population by its influence on the quality of the produce marketed within her own borders.

I quite realise that my remarks with regard to Continental methods of control may be challenged in view of the fact that foot-and-mouth disease was introduced into Scotland and the north of England, in the spring of this year, through the agency of fresh pig carcases imported from the Continent of Europe. But this fact does not necessitate modification of my statements. Negligence on the part of one country does not justify reflection on the organisation and methods of another country engaged in the same trade. Further, fresh meat is only one of the many items of farm produce which reach the British markets from the Continent of Europe.

In most large cities in Great Britain the need for a systematic inspection of meat has long been recognised and efforts have been made to meet the need. But for too long, and in too many places, it has been assumed that the work required neither special knowledge or special training. In some instances, appointments appear to have been made on the basis that the only essential qualification was a complete lack of knowledge of the work. Only a very short experience of meat inspection is required to bring appreciation of the many problems which have to be solved and to lead to a realisation of the fact that a sound knowledge of the scientific aspects of the subject is vital to sound and safe judgment.

THIS YEAR'S HOLIDAY FIXTURE: TORQUAY, SEPT. 12-17.

Intensive courses of study, which generally include experience at an abattoir, and extend over a period of from three to six months, have been arranged in certain centres for the purpose of instructing candidates who desire to qualify as inspectors of meat. These courses impart a sound knowledge of the procedure of inspection. They teach the candidate to differentiate between the normal and the abnormal, and he acquires a broad general knowledge of the more common diseases of food animals. But it cannot be seriously contended that a student without previous knowledge of the basal subjects of pathology and bacteriology can, in the time devoted to the work, obtain the training in these subjects which will enable him to give judgment on sound scientific lines. There is a useful place in a scheme of meat inspection for men so trained, provided they are subject to the direction and control of properly-qualified and experienced officers.

It is worthy of note that, both in England and Scotland, meat traders have voiced their protests against the great divergences in the practice of meat inspection which result from differences in the qualifications and training of officers to whom the duties of meat inspection have been entrusted. They have welcomed the expert whilst fearing the inexpert. Indeed, in Scotland the influence of the meat traders was an important factor in moving the Scottish Board of Health some years ago to institute a searching enquiry into the then existing system and standard of meat inspection. To that enquiry Scotland is indebted for its Public Health (Meat) Regulations which have been in operation since 1923. It is to the credit of the meat traders that in their action in this connection they were prompted by a desire to ensure adequate protection to the public combined with justice to their own legitimate trade interests. Under the Regulations referred to, a "Meat Inspector" is to be appointed in each district. Subject to certain exceptions to meet the case of existing officers having considerable experience, the Meat Inspector must be either the Medical Officer of Health or the Veterinary Inspector for that district. Responsibility for judgment of meat is vested solely in the officer so appointed. Under his direction, and subject to the production of evidence of adequate training for the purpose, the less-skilled officer receives recognition as a "Detention Officer," with the duty of detaining carcases and offal which are diseased or doubtful for judgment by his senior.

In 1922, an English Departmental Committee appointed by the Minister of Health to enquire into the subject of meat inspection made a recommendation to the effect that officers to whom the duty of meat inspection is entrusted should possess similar qualifications to those required in Scotland. Unfortunately, the Minister has not yet seen his way to translate this recommendation into action. I think, however, I am justified in saying that the English meat traders would welcome such action as being in the public interest as well as in their own.

(To be continued).

NOTES AND NEWS.

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events.

Sept. 12-17th.—N.V.M.A. Congress at Torquay.
Mar. 30th—Meeting of the Ayrshire Division, at Ayr

A Veterinary Appointment in India.

The attention of our readers is drawn to the advertisement, which appeared in last Saturday's issue of the *Record*, for an Assistant Veterinary Research Officer at the Imperial Institute of Veterinary Research, Muktesar,. U.P., India. This advertisement has been withdrawn from further publication in our columns pending the result of enquiries as to the accuracy of the initial salary offered, Rs. 250-25-750 *per mensem*, which is considered to be entirely inadequate, and members are advised to withhold application until this important point has been cleared up. Further reference to this matter will be found in our correspondence columns.

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By a curious coincidence, after writing the above, we received the following cutting from a paper, the name of which was not quoted by the sender :—

"What is a living wage for a European in India ? In a recent issue of the *British Medical Journal* an advertisement from an Indian University was printed inviting applications for the post of a Professor of Anatomy on a monthly salary of Rs.1,450. Commenting on this and similar advertisements that frequently appear in that journal for posts in India, an *Observer* warns British doctors and applicants that Rs.1,450 is not 'a living wage' in India and points out the various items of expenditure one has to incur. He says that deducting provident fund, income tax and profession tax, the net salary in this case would be Rs.1,261. Again deducting a house rent of Rs.150, motor car charges Rs. 200, clubs Rs.100, and servants Rs.200, the Professor will have only Rs.610 for purchase of food, clothes, furniture, etc. If the applicant has a wife and children they will have to be sent to the hills during summer for four months in the year, but 'on the pay offered this could not be done and it is not a living wage.' The picture may be somewhat overdone, but a European with a family to support who accepts an appointment in India on anything less than Rs.1,500 soon finds financial worries."

Will : Mr. William Griffith Jones, F.R.C.V.S., of Talbot Place, Sheffield, who died on November 6th, aged 65, left estate of the gross value of £5,652, with net personalty £3,613. He left twenty-four weeks' wages to his groom, James Morgan, if still in his service at his decease.

Magistracy Appointment: Capt. J. Gregg, O.B.E., M.R.C.V.S., Belfast, has been appointed to the Magistracy of Co. Antrim on the recommendation of the Rt. Hon. Viscount Masserene & Ferrad, His Majesty's Lieutenant for Co. Antrim, and this has been approved by His Grace, The Governor of Northern Ireland (The Duke of Abercorn, K.P.).

Mr. Walsh and the Horse.

Under the above heading the following letter appeared in the *Morning Post* of March 11th:—

"*To the Editor of the 'Morning Post.'*

"Sir,—In the discussion on the Army Estimates in the House of Commons, Mr. Walsh, Member for Ince, made the statement that 'so far as war was concerned the proper place for the horse was in a zoological museum.' It is, perhaps, somewhat difficult to follow the reasoning of certain bipeds, but it is presumed that Mr. Walsh considers, and no doubt his vast equestrian experience warrants it, that horses are now such unique and curious creatures that, lest type should be lost, they should be specially preserved in an animal museum. Perhaps when Mr. Walsh's day is done, or his utility questioned, and there is any fear that his type is in danger of being lost, he will consent to take his place also in a museum.

"The remark made by Mr. Walsh is a very poor appreciation of the services of those one-and-a-half-million noble animals who played so great a part during the Great War, and it comes most foolishly from a man who was deemed fit to be the Minister of War in the late Socialist Government.

"J. MOORE, Major-General
(Late Director of Veterinary Services, British Expeditionary Force, France).
"16, Frognal Lane, Hampstead, N.W."

The Benevolent Fund Aid Performance.

Charity must be our excuse for again referring to the performance of the play "The Rotters," the proceeds of which are to be devoted to our Benevolent Fund. We wish to emphasise the necessity for all London practitioners, and provincial ones too, to make every endeavour to support the effort being made by Lt.-Col. Simpson and his band of helpers. So far applications for tickets are coming in fairly satisfactorily, but if all those giving their time and services are to feel that their efforts have been worth while, then every one of the 350 seats must be filled. Make your application at once.

R.C.V.S. Obituary.

Barron, R., Berkeley Lodge, Blandford, Dorsetshire; Graduated, Glasgow, 21st April, 1886; Died, 5th March, 1927.

Chambers, Sam, Kirkheaton, Huddersfield; Graduated N. Edinburgh, 22nd April, 1885; Died, March, 1927.

Santy, Arthur Henry, 4, Esplanade, Lowestoft; Graduated, London, 28th April, 1859; Fellowship, 12th January, 1878; Died, 10th March, 1927. Mr. Santy was a Member of Council of the R.C.V.S. from 1882-1888, and a Vice President for the years 1886, 1887 and 1888.

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Mr. R. Barron, M.R.C.V.S.

"The town and locality generally has sustained a severe loss by the death of Mr. Robert Barron, of Berkeley Lodge, Bryanston, which occurred on Saturday at the Dorset County Hospital, Dorchester, after an illness of less than a week's duration," says a local paper of last week. "Mr. Barron left home on the previous Monday morning in the pursuit of his professional duties apparently in his usual health. While in the locality of Dorchester he became seriously ill, and was taken to the County Hospital. On Friday he appeared to have taken a slight turn for the better, but the improvement was not maintained, and he passed away during the evening. The greatest sympathy has been extended to the widow and family of one son and two daughters.

"Mr. Barron has been resident here for between thirty and forty years, and succeeded the late Mr. Aubrey in his practice. He was a member of the Royal College of Veterinary Surgeons, and had built up an extensive practice over a wide radius, his skill and knowledge being widely recognised. He also held the post of veterinary inspector, under the Dorset County Council, for the Blandford division. He accomplished a considerable amount of public work and social service. For a short period he was the Guardian and Rural District Councillor for Bryanston. He was also a director for many years of the Dorset Benefit Building Society, in which connection his services were greatly valued. In the days of the now defunct Blandford Farmers' Club he was a popular lecturer to the members on various topics connected with the management and treatment of animals, and his advice and the knowledge gained by long experience was highly appreciated. Some years ago, when the Blandford Housing Association was formed to build houses which could be let at reasonable rentals, he was one of the most enthusiastic promoters of the scheme.

"He possessed strong and uncompromising opinions on the moral and social questions of the day, and, as an able and clever debater, could attack or defend an arguable point with considerable power. He was a keen advocate of total abstinence. He had attached himself to the Congregational Church, and had held office there. His passing will be most severely felt by the Men's Adult School, of which he had been the President from the time of its inception over twenty years ago. It was here that he exercised a potent force. The sincerity of the deceased gentleman's life and actions, his invariable courtesy and kindness, and his valuable help and counsel to all who sought it, were recognised and appreciated by everyone. His death, at the age of 61 years, is deeply regretted.

"There were striking tributes to the esteem in which Mr. R. Barron was held when the funeral took place on Wednesday afternoon. A considerable time before the cortege was due to arrive at the Congregational Church, where the first portion of the funeral service was held, many people were waiting to gain admission to the building. At the cemetery, also, there was a large gathering awaiting the funeral procession. Everywhere *en route* blinds were drawn. The representative gathering of people from all classes of society was eloquent testimony to the memory of the deceased gentleman."

Amongst those present were:—Mr. E. Whitley Baker, M.R.C.V.S. (Wimborne), Mr. F. J. Thornton, M.R.C.V.S. (Dorchester), Major Sealey Green, M.R.C.V.S. (Shaftesbury), Mr. H. S. Woodhouse (Mayor of Blandford), Mr. Eric Gill, M.R.C.V.S. (Lambourn), and Mr. G. Parr, M.R.C.V.S. (Parkstone).

The late Mr. Barron's practice will be carried on by Mr. F. Beckett, M.R.C.V.S.

Mr. S. Chambers, M.R.C.V.S.

"The death occurred from influenza and pneumonia, early on Tuesday morning, of Mr. Sam Chambers, a well-known veterinary surgeon, of Croft House, Kirkheaton," says the *Huddersfield Examiner*, of March 8th. "He was sixty-three years of age, was born at Kirkheaton, and had lived there all his life.

"He qualified as a member of the Royal College of Veterinary Surgeons in 1885, and was very well known over a wide area through the practice of his profession.

For twenty-seven years he was in partnership with Mr. Harold Dyson, of 33, Queen Street, Huddersfield. The business was carried on jointly at Kirkheaton and at Queen Street.

"Outside his business, Mr. Chambers' principal interest had always been in Kirkheaton Parish Church and Sunday School, and he devoted a great deal of time in caring for the welfare of young people. His record in connection with the Kirkheaton Church Sunday School is remarkable. During fifty years as scholar, teacher, and superintendent he served continuously. He was superintendent of the Sunday school for thirty years. In the church he had held practically every office at one time or another, including that of churchwarden. For many years he was a trustee of Lees Charity, and at the time of his death he was secretary to the trustees. His death robs Kirkheaton of an outstanding personality.

"Mr. Chambers leaves a widow and one daughter.

"The large attendance at the funeral, which took place at Kirkheaton Cemetery, yesterday afternoon, was a testimony to the esteem in which Mr. Chambers was held in the district.

"The following members of the Yorkshire Veterinary Medical Society were present:—Messrs. W. A. Campbell (president), J. McKinna (Huddersfield), F. Hallilay (Dewsbury), S. E. Sampson (Sheffield), W. Ackroyd (Halifax), and A. McCarmick (Leeds)."

Mr. A. H. Santy, F.R.C.V.S.

"The funeral took place yesterday," says the *Eastern Daily Press* of 15th March, "at Eaton Church, Norwich, of Mr. Arthur Henry Santy, a well-known veterinary surgeon, whose death occurred on Friday at Lowestoft, where he had lived for the last eight years.

"Mr. Santy, who was 87 years of age, was the oldest veterinary surgeon in Norfolk, and one of the oldest, if not actually the oldest, in the United Kingdom. He qualified in London in April, 1859. A Fellow of the Royal College of Veterinary Surgeons, he was vice-president and a member of the Council of the College. Mr. Santy was also very closely associated with the Eastern Counties' Veterinary Medical Association, of which he was a past president, and in later years hon. associate. He practised for many years on the Cattle Market, Norwich. He became a partner with the late Mr. Wells in the firm of Wells & Santy. Popular, and a great help to the profession, Mr. Santy was also an enthusiastic bowls player, a fisherman, and a good shot. A Freemason, he was associated with Union Lodge, Norwich. He was twice married. He is survived by his widow, and a daughter. Mr. Santy was a man of high repute in his profession, and retired from active practice when quite a young man. He was succeeded in his Norwich practice by Mr. W. F. Howes.

"Among the general congregation at the service at Eaton Church were Mr. W. Shipley, M.R.C.V.S., Great Yarmouth (representing the Royal College of Veterinary Surgeons and the Eastern Counties' Veterinary Medical Association), Mr. Harry V. Low, M.R.C.V.S., Mr. H. P. Standley, M.R.C.V.S., Mr. W. F. Howes, M.R.C.V.S., and Mr. E. Margarson, M.R.C.V.S. (Swaffham).

"Among the floral tributes were wreaths from the president and members of the Council of the Royal College of Veterinary Surgeons, and from the members of the Eastern Counties Veterinary Medical Association."

Proposed Honour to Principal Sir George Adam Smith.

Those of our readers who visited the 1924 Congress of the Association held at Aberdeen, and the numerous other members who are acquainted with him personally, will be glad to learn of the setting on foot of a movement (to which many will wish to give their practical support) to present the Very Rev. Principal of Aberdeen University, Sir George Adam Smith, with his portrait.

The recipient of the proposed honour, by the warmth and dignity of the academic welcome which he accorded the N.V.M.A. on the occasion of their visit, by the keen interest which he displayed in the week's proceedings, and by the practical help he gave to the Congress in securing the sanction of the Senate for the use by the Association of the noble university buildings, contributed very materially to the outstanding success of the 1924 meeting.

In the course of a long account commending the movement not only to the citizens of Aberdeen but to the public of Scotland, the *Aberdeen Press* of March 12th, says:—

"A movement, which is sure to meet with the hearty approval of all sections of the community, was definitely set on foot in Aberdeen yesterday when the proposal to present the Very Rev. Principal Sir George Adam Smith with his portrait was inaugurated in the presence of a large company representative of the public, business and professional life of the city and county. The Principal is not only one of Aberdeen's most eminent citizens, he is known throughout the English-speaking world as one of Scotland's most distinguished sons. It is proposed that the portrait when completed and presented should be added to the collection of paintings of distinguished men preserved in the Picture Gallery of the University."

The *Press* prints many eloquent tributes paid to Sir George Adam Smith on this occasion, among them being those of the Rector of the University (Viscount Cecil of Chelwood), Lord Provost Lewis, The Marquis of Aberdeen and Temair, Sir James Murray, Dr. Gordon J. Murray, Professor J. Arthur Thomson, Dr. J. E. Crombie and Sir Thomas Jaffrey. The motion submitted by the Lord Provost was in the following terms:—

"That this meeting of friends and admirers of the Very Reverend Principal Sir George Adam Smith, M.A., D.D., LL.D., Litt.D., F.B.A., resolves that the time is opportune for recognising the great service that he has rendered in the causes of religion, education, and letters, as well as the distinguished part he has taken in all movements for the furtherance of the public weal, and that, accordingly, he be requested to allow his portrait to be painted and added to the collection of portraits of distinguished men preserved in the Picture Gallery of the University."

An Executive Committee was appointed to wait on the Principal, issue an appeal for subscriptions, select an artist, and take all necessary steps for carrying out the proposal.

Tailless Sheep.

"A correspondent informs me that he has had an inquiry from a sheep farmer in South Dakota, U.S.A., as to whether he could tell him of a breed of sheep that is naturally tailless. I am asked if I can assist in giving a definite answer. I think I can, and it is that there is no such breed known in this country," says the Agricultural correspondent of *The Times*. "The inquirer suggested that sheep on some of the Outer Hebridean Islands have no tails, but, so far as I have been able to ascertain, this is not the case. The object that inspired the query is the same as has frequently raised the point in this country—a wish that the simple but important operation of "docking" lambs might be rendered unnecessary. The "fly" or "maggot" pest is the root of the trouble. Long tails have been proved to conduce to fly attacks, and it is felt that if the Manx cat has a counterpart in the ovine world its distinguishing feature might be a point in its favour. The tailing of lambs involves little discomfort to the youngsters, as is evident from the speedy resumption of their wonted gambols, but, even if it were severe, it would be nothing in comparison with the torture endured and, where attack is not detected quickly, the certain and agonizing death that results from fly attack."

Cattle Transport by Sea.

"The discussion on the transport of cattle by sea is interesting because of its importance to stockowners and the known injury that results from defects that undoubtedly obtain. Whatever the cause, it has been found that cattle making the short sea voyage from Ireland have taken longer to recover from the effects of the journey than cattle coming all the way from Canada. "Transit fever" may be a vague term, but it conveys much to buyers of Irish cattle. The losses that have been experienced, and so described, in animals from Ireland have not only made British graziers careful in buying consignments newly landed from Ireland, but they also point to some serious defect in the arrangements for the accommodation of the cattle during the passage across the Channel The crossing is often rough in the winter months and hardships severe, and the evidence of British buyers suggests that there is room for improvement at some stage, or in some part, of the journey."—*The Times.*

Glasgow Veterinary College.

"Glasgow Veterinary College is still far short of the sum aimed at by the governors to place the institution on a financially sound basis. The response so far made to the appeal has yielded £8,000, but the sum in view is about £30,000. The contributions received up to date have taken the form of fairly large subscriptions, and it is felt that an effort is required to bestir practical interest on the part of the general body of farmers. For that purpose it is proposed to carry the appeal into the show-yards of the leading West of Scotland agricultural societies this season, beginning with Kilmarnock Show on April 16. It is hoped that a ready response will be forthcoming to the canvass which will be conducted at these events." —*Glasgow Herald.*

Northallerton Council and The Dairies Order.

An important statement with regard to the working of the Milk and Dairies Order of 1926 was made by the Chairman of the Sanitary Committee of the Northallerton Urban Council on March 2nd, who drew attention to the speech made by Mr. Pratt, veterinary inspector to the North Riding County Council, to the local branch of the N.F.U., Mr. Pratt said the Chairman had rightly stated that the only people with authority to visit cow byres and demand any cow to be milked were qualified veterinary inspectors or veterinary surgeons. During the discussion at that meeting it had been stated that some medical officers and sanitary inspectors of local councils had taken these duties upon themselves, but he wished to make it quite clear that this had not been done by the Northallerton Urban Council officers. The speaker also pointed out that the portions of the Order referring to cowsheds and conditions were definitely the province of the local sanitary authorities.

The Tuberculosis Order.

Mr. Guinness, Minister of Agriculture, replying in the House of Commons on Monday, to Mr. Buxton, said that from September 1st, 1925, to December 31st, 1926, 23,369 cows were slaughtered by local authorities under the Tuberculosis Order, 1925, for which compensation amounting to £90,184 was paid.

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At a recent meeting of the Executive Committee of the Aberdeen County Council the occurrence was reported, since the last meeting (presumably a month previous) of thirty-seven cases under the Tuberculosis Order, 1925. The total valuation of the thirty-seven animals was £200, and the total compensation paid £110, the salvage so far amounting to £20 11s. 5d.

The Chairman remarked that the result of the nine months' operations of the Order in Aberdeenshire showed that there was a considerable number of cases of tuberculous cows in the county, and justified not only the Government but that committee in taking action in the matter.

Disinfection of Animals.

Mr. Guinness informed Dr. Fremantle that the test for disinfectants which the Ministry of Agriculture had adopted for use under the Diseases of Animals Acts was framed after full consideration and scientific advice, as being a test conducted under conditions which resembled as closely as possible the actual circumstances in which the disinfectants were used in practice. Dr. Fremantle asked if this had been agreed upon in consultation with other Government departments which were equally concerned in getting a reliable test. Mr. Guinness said that the requirements of the other offices were very different from those of agriculture. He did not think it necessary to have the matter reconsidered. In reply to a further question by Dr. Fremantle, Mr. Guinness said that he was not aware that brands of disnfectants approved by the Ministry were being freely sold to agriculturists in inferior strengths and not labelled in accordance with the Diseases of Animals Disinfection Order, 1926. Agriculturists and others required to use approved disinfectants by any Order issued under the Diseases of Animals Acts should be careful to see that the preparation they were obtaining for that purpose was labelled clearly as prescribed in the Disinfection Order of 1926.

That Iron Lid!

"One more nail in the coffin of the poor practitioner," writes the sender of the following cutting from the *Farmer and Stockbreeder* of February 25th :—

"*Veterinary Advice.*

"I have obtained many valuable hints from 'Vet.'s' contributions to your columns and answers to correspondents. I would suggest that other readers adopt my plan of cutting out every prescription of special interest and pasting it in a note book for future reference. I number each prescription, and then get a reliable chemist to make up the mixture. The bottle is numbered to correspond with the number of the particular prescription in the note book ; and by this means I am able to find in the medicine cupboard a remedy for almost any ailment at a moment's notice. I used to pay from £15 to £30 a year for veterinary advice, but since I accumulated 'Vet.'s' prescriptions in this way I never call in a veterinary surgeon and have better results.—T. F., Yorks."

The Zoological Society of London hopes to begin very soon the development of what will be at once a wild bird sanctuary, a reserve for British fauna and an exercise and breeding station and country home for the animals in the London Zoo, and ultimately a great zoological park. For these purposes the council of the Zoological Society has purchased from the trustees of the Ashridge estate a property of over 400 acres, lying under the Dunstable Downs, midway between Tring and Luton.

A Veterinary Coincidence.

The truth of the following story is vouched for by a veterinary surgeon "stationed in an up-country place in the East," who writes :—

"Many years ago a friend of mine who lived many hundreds of miles away came to stay with me—his name is Mr. X. At the time of his visit my little dog was ill, and Mr. X made a fuss of him.

"About a week after Mr. X. left my house I found that my dog suffered from rabies. Thereupon, I wired to Mr. X. as follows: 'Dog developed rabies, advise you to have treatment.'

"Then came the coincidence. A Mrs. Y. wrote to my wife and asked her if she would ask me whether rabies was contagious or not, as a girl friend of hers had been kissed by a man who had had information that a dog he had touched had developed rabies, and the owner had wired to him. What was she to do? She could not tell her parents. Would Mrs. Y. please write to anyone and find out what she should do?

"Mrs. Y. then writes to my wife, and the circle is completed.

"I think it is safe to tell this story now as the parties concerned are happily married."

H.M. Stationery Office Publication.

The undermentioned has been published during the week. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office, at the following addresses:—London: Adastral House, Kingsway, W.C.2, and 28 Abingdon Street, S.W.1; Cardiff: 1 St. Andrew's Crescent; Manchester: York Street; Edinburgh: 120 George Street.

	Price Net.	*Post Free.*
House of Commons Bills, 1927:—	s. d.	s. d.
82. Diseases of Animals (H.L.). To amend the Diseases of Animals Acts, 1894 to 1925	0 2	0 2½

"An order for a pair of boots for a valuable Alsatian dog belonging to a Blackpool exhibitor has been placed with Mr. Charles Crossley, a surgical bookmaker, of Blackpool and Burnley.

"The Alsatian, which is 11 months old, was found to be suffering from chilblains between its toes, and a veterinary surgeon said that by wearing a correctly made boot, and so keeping its feet dry, a cure would soon be effected.

"The boots will be of leather, lacing up from the toes to the first joint of the leg. The upper parts of the boots will be grey, to match the dog's coat."—*Evening News.*

New Book Announcement.—Messrs. William Hodge & Co. Ltd. intimate the impending publication of a text book on "The Principles and Practice of Meat Inspection" in one volume. The work is by Dr. Gerald Leighton, the well-known authority on food inspection and administration. The book will contain over one hundred illustrations of pathological conditions in meat animals.

CORRESPONDENCE.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

Diagnosis of Distemper.

To the Editor of The Veterinary Record.

Sir,—It appears from recent correspondence and discussion that there is very little agreement on the proper reply to one of the fundamental questions of distemper research, *viz.*, can a dog have distemper more than once?

There is a time-honoured school of thought which answers "No" in quite emphatic tones and to this school many of the seniors in our craft seem to belong. But there are others who feel obliged to confess to having met with symptoms extremely like distemper in a dog known already to have had this malady. These symptoms are cough, conjunctivitis, gastro-intestinal catarrh, malaise, fever, nervous phenomena, etc. These may all appear in the same animal. It has been my own habit to describe these attacks as "influenza," or "chill," or "gastro-intestinal catarrh." In other words, I have evaded a true diagnosis by stressing some particular symptom. At a recent meeting of the Central Division, a medical contributor to the discussion seemed to suggest that "influenza" was somewhat loosely diagnosed even by medical practitioners and there seemed a general concensus of opinion among the veterinarians present that with them also, influenza was a sort of general purposes diagnosis.

Now, these things ought not to be so. There are many veterinary practitioners who refuse to diagnose distemper more than once in the same dog. Granting that there are attacks subsequently of something very similar—what is this something?

If there is any worth in a particular collection of symptoms as a basis for diagnosis, these attacks are distemper and would be diagnosed as such if the history of the dog did not show that it had already had this complaint.

If they are not, will some authorities kindly state the differential diagnosis between a mild attack of distemper and influenza in the dog?

Would it not be possible for those who are researching into distemper to inoculate the virus they have obtained into dogs that are known to have had distemper at least eighteen months previously. A record of all consequent symptoms, whether negative, or whether frankly those of distemper or showing analogies suggesting some modified form, would be of considerable value to those of us who are anxious to help in this most important question.—Yours faithfully, Leslie P. Pugh.

Pennard House, Sevenoaks.

12*th March*, 1927.

Assistant Veterinary Research Officer for Muktesar, India.

To the Editor of The Veterinary Record.

Sir,—I feel it is desirable that I should call attention to the advertisement regarding the above appointment which appears in your issue of 12th March. I think that a clerical error must have been made in respect to the pay offered, *viz.*, Rs.250 per month rising by Rs.25 (per annum) to Rs.750 per month. Probably the intention is Rs.**550**—25—Rs.750 per month. The matter ought to be made clear, lest there should be a misunderstanding in application. Another feature of the advertisement which is rather disconcerting is the bracketing of graduates of British Veterinary Colleges and graduates of Veterinary Colleges in India on an equal footing for appointment, unless the words "of proved ability, with much experience in practical work, and an advanced course of training in veterinary science to their credit," are intended to apply only to graduates of veterinary colleges in India.

I suggest that the advertisement should be referred back for a clearer understanding.—Yours truly, J. Moore.

16, Frognal Lane, Hampstead, N.W.3.

15*th March*, 1927.

The Editor acknowledges the receipt of the following:—

Report of the Annual Meeting of the Ayrshire Division, from Mr. David Brown, Kilwinning.

Annual Report of the Department of Veterinary Science and Animal Husbandry, Tanganyika Territory, 1925.

Memoirs of the Department of Agriculture, India, Vet. Series, Vol. iii, No. 7 (Experiments on the Treatment of Hookworm Infection in Dogs, by A. Gulati, M.Sc.); No. 8 (On the Occurrence of a Lung Fluke—*Paragonimus edwardsi*—n. sp. in a Palm Civet—P. grayi—in Kumaon. Hills, by A. Gulati, M.Sc.) and No. 9 (On the Occurrence of Isospora and Balantidium in Cattle, by Hugh Cooper, M.R.C.V.S., and A. Gulati, M.Sc.).

Communications from Professor G. W. Clough, Messrs. I. R. R. Coleman, F. T. Harvey and R. L. Higgins.

National Veterinary Medical Association of Great Britain and Ireland.

EDITORIAL OFFICE: 10 Gray's Inn Square, London W.C.1.

All communications relative to the literary side of the Veterinary Record must be addressed to the Assistant Editor, "Veterinary Record," 10 Gray's Inn Square, W.C.1